# Onondaga Lake
# Inner Harbor Dredging Design Project
# Syracuse, New York

# FINDING OF NO SIGNIFICANT IMPACT
# AND
# ENVIRONMENTAL ASSESSMENT





DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

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The U.S. Army Corps of Engineers, Buffalo District has assessed the environmental impacts of this project and has determined a finding of no significant impact (FONSI). The selected Syracuse Inner Harbor dredging plan would allow the New York State Canal Corporation to dredge the Syracuse Inner Harbor Terminal area, New York. The proposed project would involve the removal of approximately 60,000 cubic yards of dredged material from the Inner Harbor Terminal area and the associated disposal of the dredge spoils in an adjacent Confined Disposal Facility (CDF) UDS 5-19. The proposed plan calls for a 60 foot bottom wide channel, 10 feet deep, 3H (height):1 (vertical) side slopes, with only the first northern-most Inner Harbor Terminal slip area to be dredged.

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ONONDAGA COUNTY, NEW YORK
DREDGING AND CDF DISPOSAL

SECTION 401 SYRACUSE INNER
HARBOR PROJECT

## FINDING OF NO SIGNIFICANT IMPACT

The U.S. Army Corps of Engineers, Buffalo District has assessed the environmental impacts of the following project in accordance with the National Environmental Policy Act of 1969 and has determined a Finding of No Significant Impact (FONSI). The attached Environmental Assessment presents the results of the environmental analysis.

Onondaga Lake in central New York just outside the City of Syracuse in Onondaga County, New York (Figure EA-1). The Inner Harbor area is situated at the southeast end of Onondaga Lake just west of downtown Syracuse (Figure EA-2). Shoaling in the Inner Harbor Terminal Area occurs at a relatively rapid rate. Sediments primarily from Onondaga Creek as well as from the surrounding watersheds, streambanks, and shorelines gradually fill in Inner Harbor Terminal area. As a result, the Inner Harbor needs to be dredged in order to maintain sufficient depths for commercial and recreational navigation. The purposes of the project are not only to maintain adequate conditions for safe and efficient commercial and recreational navigation, but also improve water quality within the Inner Harbor area by removing sediments. This project would demonstrate that there are many complex parameters that impact upon the cleanup of polluted sediments in an urban environment.

The selected Syracuse Inner Harbor dredging plan would allow the New York State Canal Corporation to dredge the Syracuse Inner Harbor Terminal area, New York. The proposed project would involve the removal of approximately 60,000 cubic yards of dredged materials from the Inner Harbor Terminal area and the associated disposal of the dredge spoils in an adjacent Confined Disposal Facility (CDF) UDS 5-19 (Figure EA-3). The proposed plan calls for a 60 foot bottom wide channel, 10 feet deep, 3H (height):1 (vertical) side slopes, with only the first northern-most Inner Harbor Terminal slip area to be dredged (Figure EA-2). Due to the small size of UDS 5-19 the scaled-down modified plan has become the preferred plan for the Syracuse Inner Harbor Dredging Project.

Sediments from within the Inner Harbor have been analyzed and determined to be suitable for placement in a Confined Disposal Facility (CDF). The dredge material will be removed from the Inner Harbor area by using a hydraulic dredge. Use of a hydraulic dredge is the preferred method for spoil removal due to the very loose nature of the sediment materials present in the harbor. Use of a hydraulic dredge will help keep most turbidity associated with the dredging from reaching the main body of Onondaga lake. A silt curtain may also be employed at the harbor entrance as needed to further minimize any de-minimis discharges during the dredging operation.

The proposed plan calls for the sediments hydraulically dredged from Syracuse Inner Harbor area to be discharged through pipes directly into the constructed CDF facility UDS 5-

19. UDS 5-19 was previously used as a disposal site in 1980. This 9.1 acre site is immediately adjacent to the Inner Harbor and will be re-constructed in order to be able to handle the proposed dredged materials (Figure EA-3). This alternative was selected since UDS 5-19 was used in the past and its location would allow the use of hydraulic dredging. Dredge material proposed for disposal at UDS 5-19 is compatible both physically and chemically with existing on-site material. Reconstruction of dikes with on-site material will result in very low permeability dikes which will adequately retain dredge sediments and associated contaminants.

All reasonable alternatives to the recommended Inner Harbor dredging plan were considered, and it was found that the proposed dredging of the Inner Harbor and the discharge of dredged material at the existing CDF Site UDS 5-19 would be the preferred alternative. The "No Action" alternative was also considered, but was dismissed since it would not provide a solution to the present dredging needs of the Syracuse Inner Harbor area.

Analysis has shown that the dredging plan and associated discharge at an existing CDF disposal area are not major Federal actions which would result in significant adverse impacts on the quality of the human or natural environment. Public coordination, to date, has uncovered no areas of significant environmental controversy. During the official 30-day review period, no substantial adverse comments concerning the project were received. Based on these factors, I have determined that an Environmental Impact Statement will not be required.

Michael J. Conrad, Jr
Lieutenant Colonel, U.S. Army
Commanding

Date: 27 Apr 98

Enclosure as stated

Figure EA-1 - Onondaga Lake, Syracuse
Inner Harbor
Vicinity Map

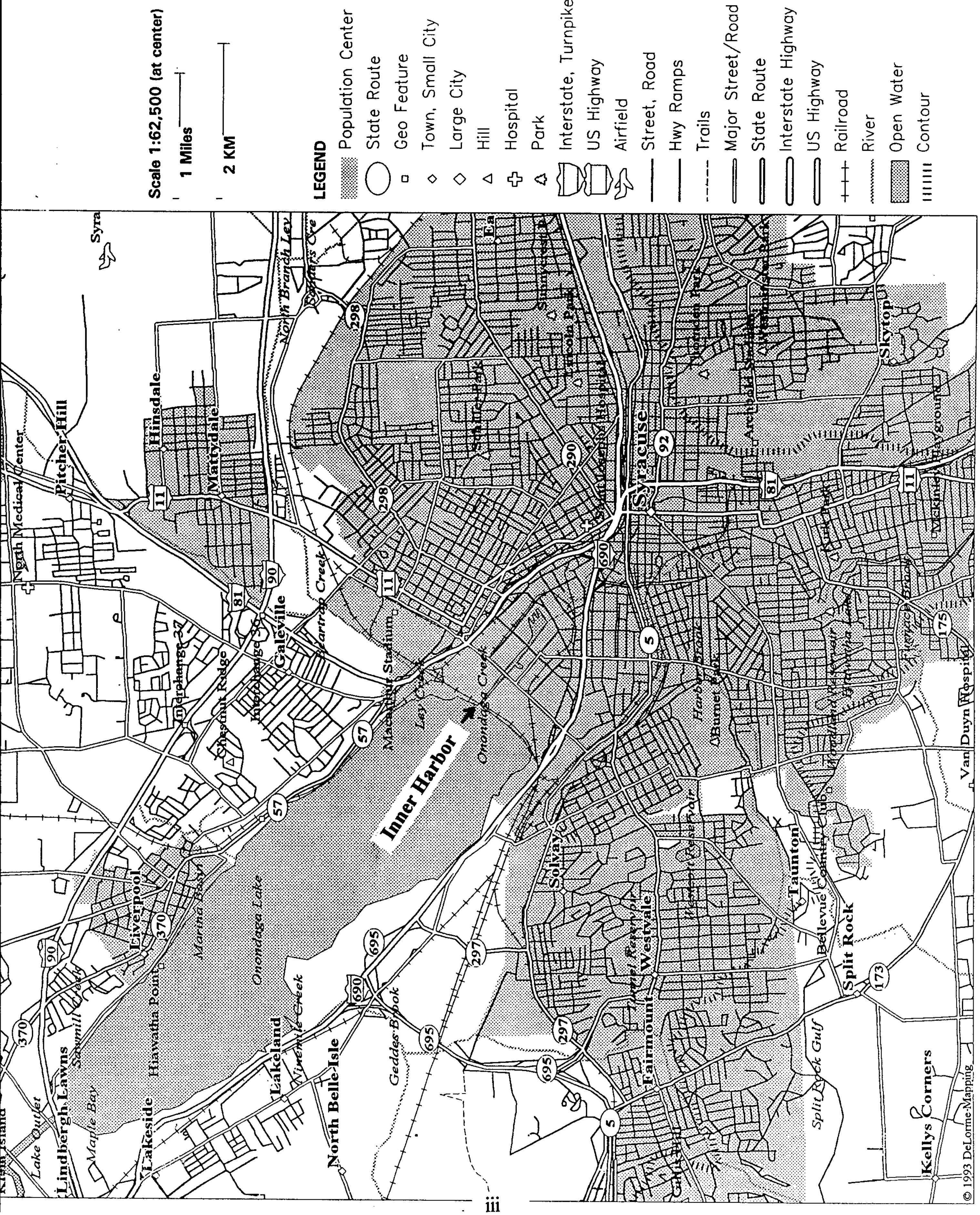


Figure EA-2 - Onondaga Lake, Syracuse
Inner Harbor
General Project Location Map

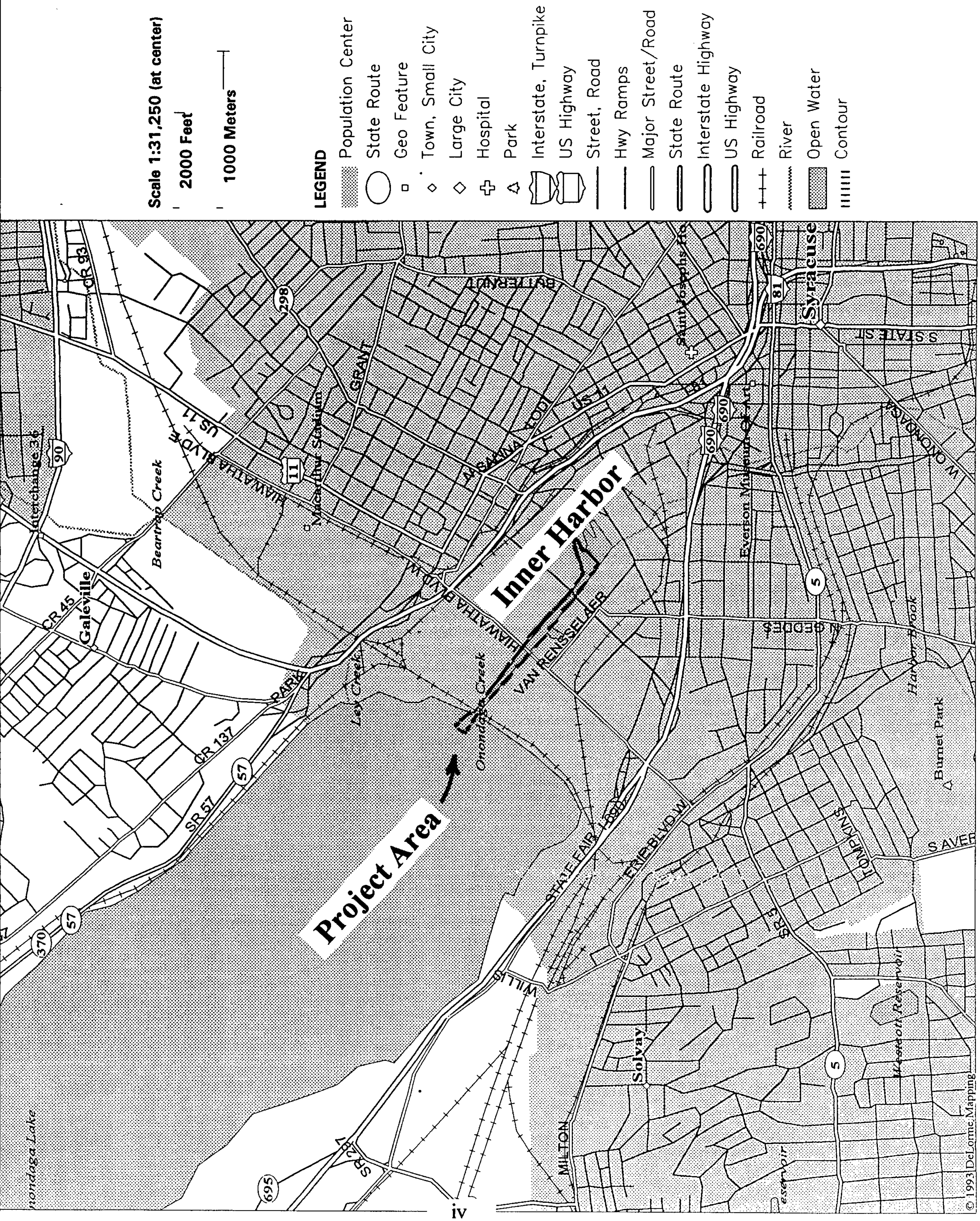


Figure EA-3 - Onondaga Lake, Syracuse
Inner Harbor
Detailed Project Location Map

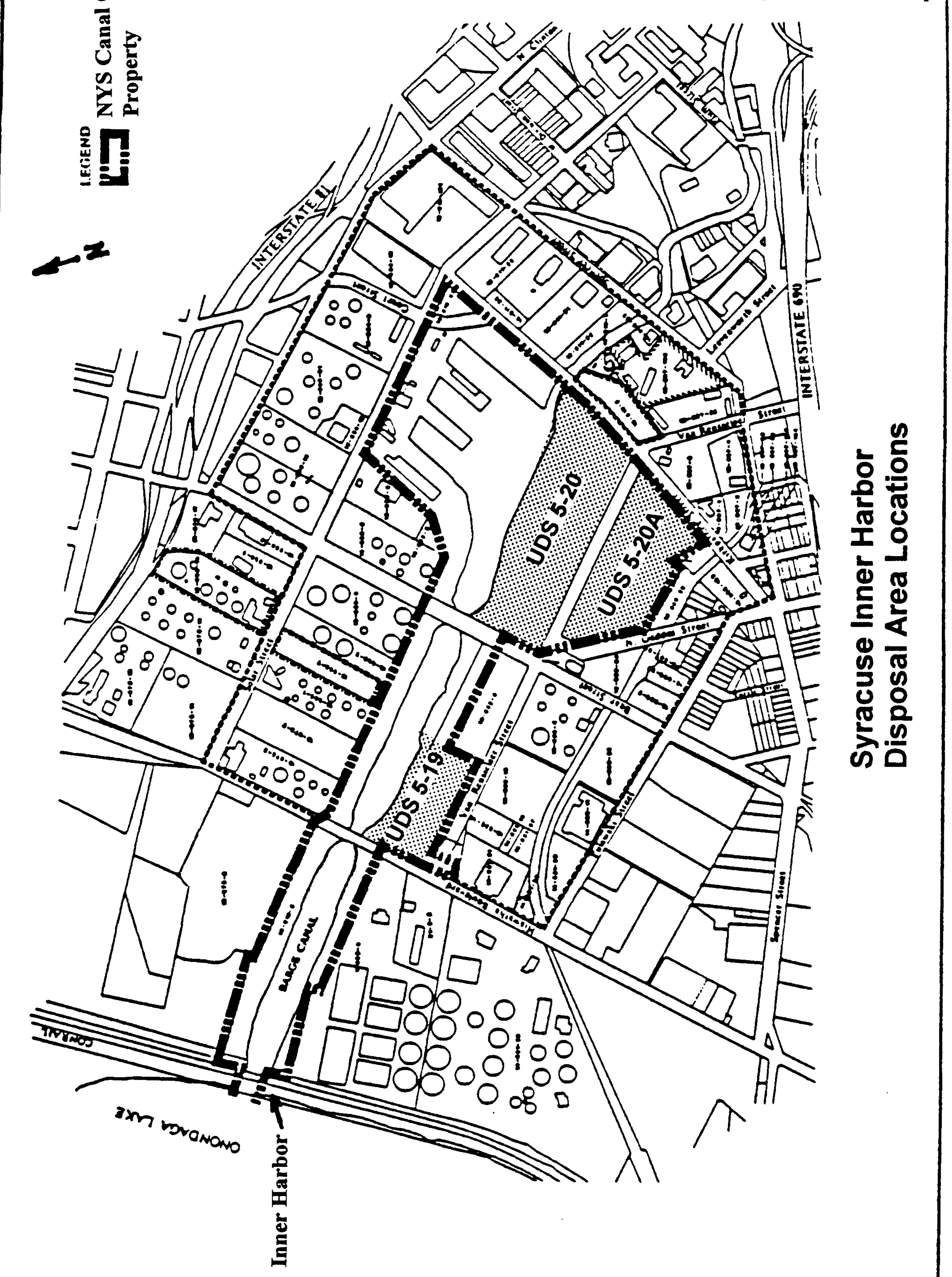
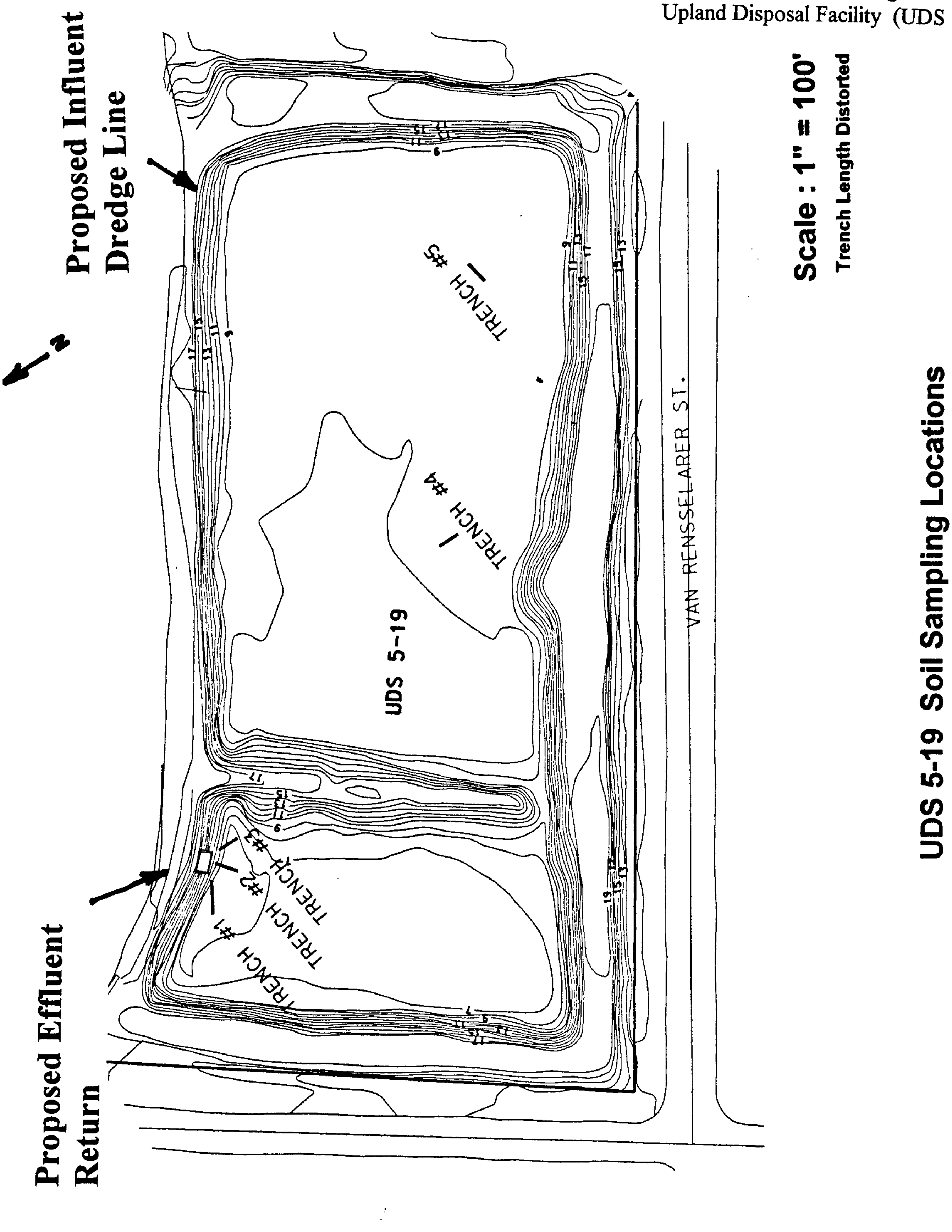


Figure EA-4 - Onondaga Lake, Syracuse, Inner Harbor
Location Map of Existing
Upland Disposal Facility (UDS 5-19)



SYRACUSE INNER HARBOR
ONONDAGA COUNTY, NEW YORK

DREDGING AND CONFINED
DISPOSAL OF DREDGED MATERIAL

**ENVIRONMENTAL ASSESSMENT**

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SYRACUSE INNER HARBOR
ONONDAGA COUNTY, NEW YORK

**ENVIRONMENTAL ASSESSMENT**

# 1. INTRODUCTION

This section briefly summarizes the study authority, purpose for the environmental assessment, location, problems, and needs, and planning objectives.

## 1.1 AUTHORITY

1.1.1 The original cleanup plan for Onondaga Lake was authorized by: Resolution, Committee of the Environment and Public Works of the U.S. Senate, June 1989. A demonstration project to improve Onondaga Lake water quality was authorized by Congress under Section 401 of the Great Lakes Critical Programs Act of 1990 (Public Law 101-596). The Assistant Secretary of the Army for Civil Works, acting jointly with the Administrator of the Environmental Protection Agency and the Governor of the State of New York convened a management conference for the restoration, conservation, and management of Onondaga Lake in 1991. The Onondaga Lake Management Conference is composed of representatives of the Assistant Secretary of the Army for Civil Works, the Administrator of the Environmental Protection Agency and the Governor of the State of New York (New York State Department of Environmental Conservation and Attorney General of New York State), Onondaga County, New York, and the City of Syracuse, New York. This Management Conference passed a resolution on 10 December 1991 that "resolved that the Onondaga Lake Management Conference authorizes and directs the U.S. Army Corps of Engineers (Buffalo District) to proceed, in conjunction with the Lakefront Development Office of the City of Syracuse; to dredge and improve the Inner Harbor at the southern end of Onondaga Lake within the funds made available to the U.S. Army Corps of Engineers." Subsequently, the Assistant Secretary of the Army for Civil Works approved the expenditure of a portion of the fiscal year 1992 Onondaga Lake appropriation ($350,000) for the planning and design of a dredging project at the Syracuse Inner Harbor.

## 1.2 PURPOSE AND SCOPE

1.2.1 The purpose of this Environmental Assessment (EA) is to evaluate the impacts and provide sufficient information on the potential effects of the project, as proposed by the U.S. Army Corps of Engineers, Buffalo District, to determine if it is a major Federal action significantly affecting the quality of the human environment. This EA facilitates coordination and compliance with the National Environmental Policy Act (NEPA), and includes discussions of the need for the action, its environmental impacts, alternatives, and a list of agencies, interested groups and individuals consulted.

1.2.2 The project addressed in the EA and Appendices will address the impacts associated with the dredging of the Inner Harbor area as well as the use of UDS-19 as a Confined Disposal Facility (CDF) for the dredge spoil materials (Figure EA-3).

## 1.3 LOCATION AND PROBLEMS AND NEEDS

1.3.1 Onondaga Lake is located entirely within Onondaga County at the northern end of the City of Syracuse. The lake flows from the southeast to the northwest and discharges into the Seneca River and eventually into Lake Ontario via the Oswego River, formed by the confluences of the Seneca and Oneida Rivers (Figures EA-1 and EA-2). Onondaga Lake, with a total drainage area of 245 square miles and a surface area of 4.6 square miles is part of the New York State Canal system. The city of Syracuse is located along the south shore of the lake. The Inner-Harbor area extends from the New York State Canal Corporation (NYSCC) Terminal on Onondaga Creek to the deeper water depths of Onondaga Lake.

1.3.2 Onondaga Lake and its tributaries have been greatly impacted by both domestic and industrial wastes that accompanied the development of the Syracuse area since the late 1800's. Reference Community and Regional Growth in Section 2 - ENVIRONMENTAL SETTING. Water and sediment quality pollution problems include those pertaining to: ammonia, phosphorus, sodium, calcium chloride, metals (zinc, lead, copper, chromium, cadmium, mercury, iron), chlorobenzene, fecal coliform, high turbidity, altered nearshore sediments (i.e., calcium carbonate, phosphorus, mercury, etc.), and resultant associated system processes.

1.3.3 Figure EA-5 depicts Onondaga Lake and the location of its major tributaries. Table EA-1 provides a selective listing of the problems of the lake. Table EA-2 provides a listing of the lakes major tributaries, inflows, and associated past and/or present pollutants. Figure EA-6 depicts the occurrence of oncolites and Calcium Carbonate delta. Figure EA-7 depicts concentrations of mercury in lake sediments (Effler, S.W., 1986).

1.3.4 Swimming is prohibited because of high concentrations of fecal bacteria (presently being addressed in Onondaga Lake CSO Project) and low transparency. Other water and sediment quality pollution problems likely exist in this regard for which there may not be any health and safety standards.

1.3.5 The fishery of the lake has been negatively impacted by the prevalence of high concentrations of ammonia and other pollutants, low dissolved oxygen levels, degraded sediments and associated nearshore habitat, and concentration of fish flesh with mercury.

1.3.6 Pollution problems in Onondaga Lake also pollute the lake outlet.

Table EA-1 - Water Quality Related Problems of Onondaga Lake

1. high concentrations of ammonia
2. low transparency
   - high loading of phosphorus
   - high concentrations of phytoplankton
3. low concentrations of dissolved oxygen
4. high concentrations of fecal coliforms
5. mercury contamination
   - fish flesh
   - sediments
6. sediment releases
   - nutrients
   - toxics
7. high sedimentation rates
8. chlorobenzene contamination
9. ionic enrichment
10. altered near-shore sediments
11. altered food chain interactions
12. impact of lake releases on river quality

(Effler, 1989)

Table EA-2 - Onondaga Lake Tributaries, Inflows, Pollutants

| Tributary (Inflow) | Pollutants |
|---|---|
| 1. Ninemile (38 %) | (2) Treated Wastewater (Camillus, Marcellus)<br>Wastebed (Overflow & Infiltration)<br>Inorganic Salts (Sodium, Calcium, Chloride)<br>Heavy Metals (Zinc, Lead, Copper, Chromium, Cadmium, and Mercury) |
| 2. Onondaga (34%) | (53) Combined Sewer Overflows<br>Fecal Coliform Bacteria<br>Salts<br>Heavy Metals (Lead, Copper, Chromium)<br>High Sedimentation |
| 3. Metro Sewage Treatment Plt. (17%) | Treated Wastewater (Syracuse) |
| 4. Ley (8%) | (2) Combined Sewer Overflows<br>(2) Sanitary Sewer Overflows (Brooklawn and Ley Creek)<br>BOD<br>Bacteria<br>Sanitary Landfill |
| 5. Harbor Brook (3%) | 20 Combined Sewer Overflows (Hillcrest Brookside)<br>Inorganic Carbon<br>Particulate Organic Carbon<br>Metals (Copper, Lead) |
| 6. Trib. 5A (Minor) | Treated Wastewater (Crucible Steel)<br>Reduced loadings now - Industrial Wastewater Reuse and Treatment<br>Historically<br>Metals (Iron, Chromium, Copper) |
| 7. Bloody Brook (Minor) | Treated Coolant & Wastewater (General Electric) |
| 8. Sawmill (Minor) | |

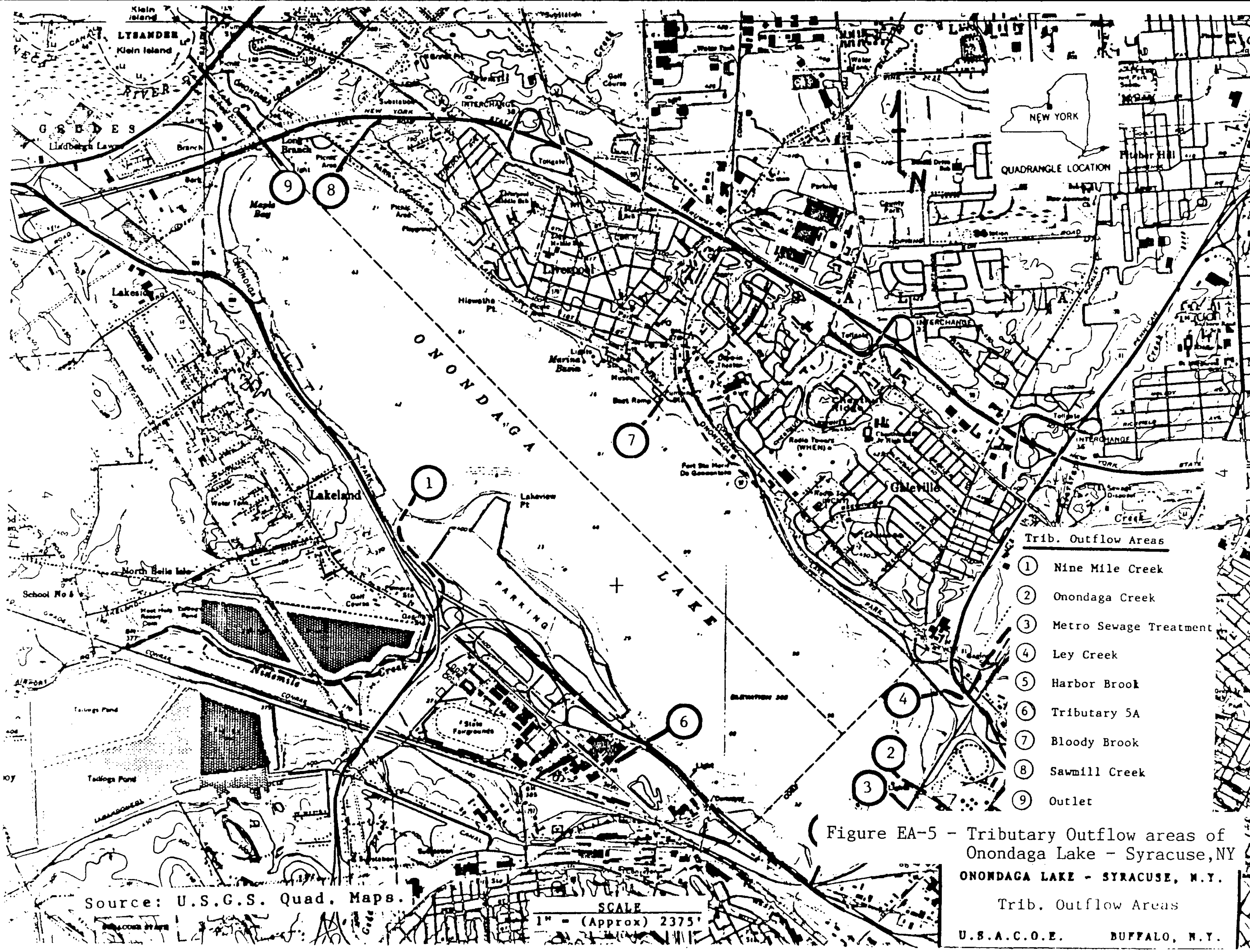



Figure EA-5 - Tributary Outflow areas of Onondaga Lake - Syracuse, NY

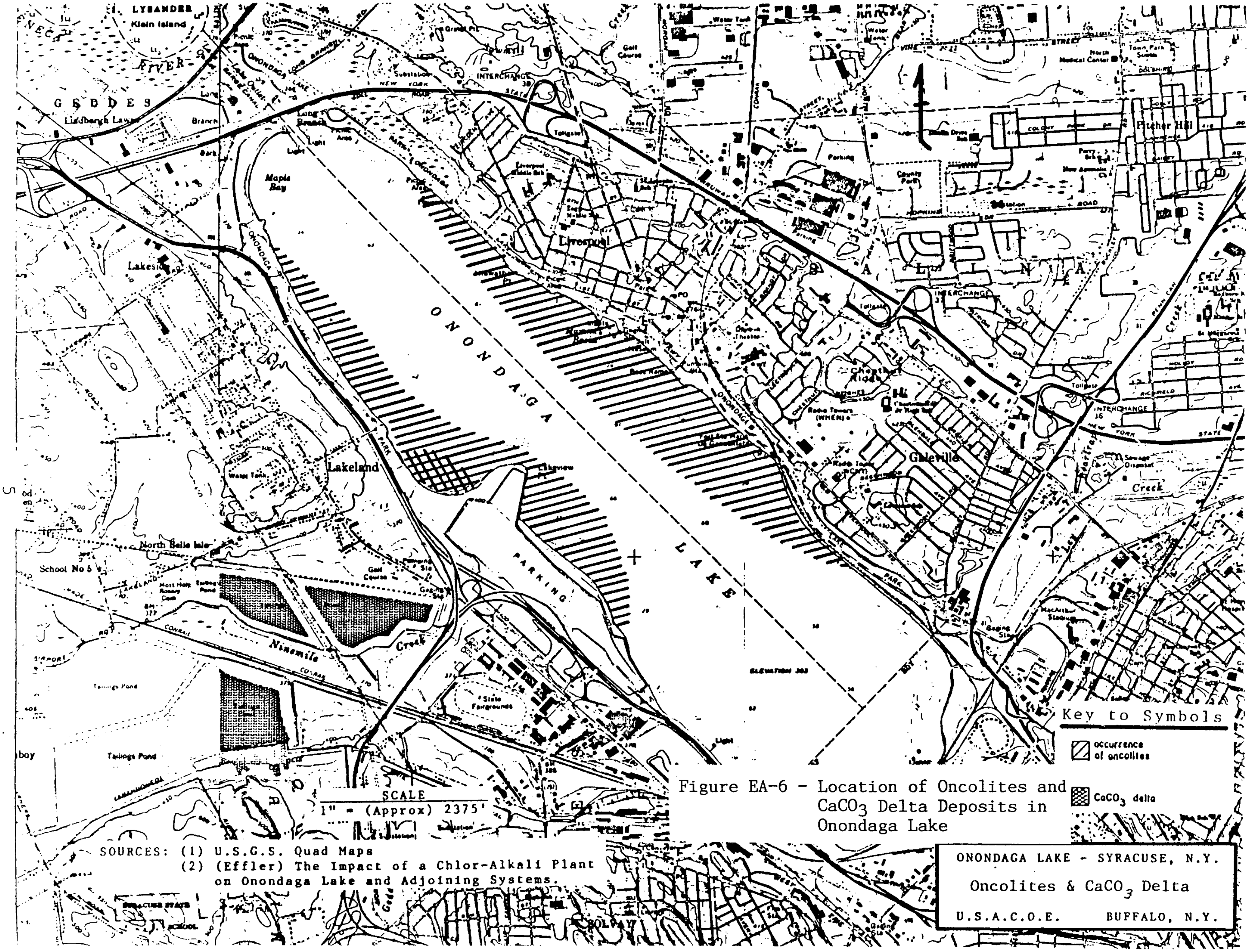
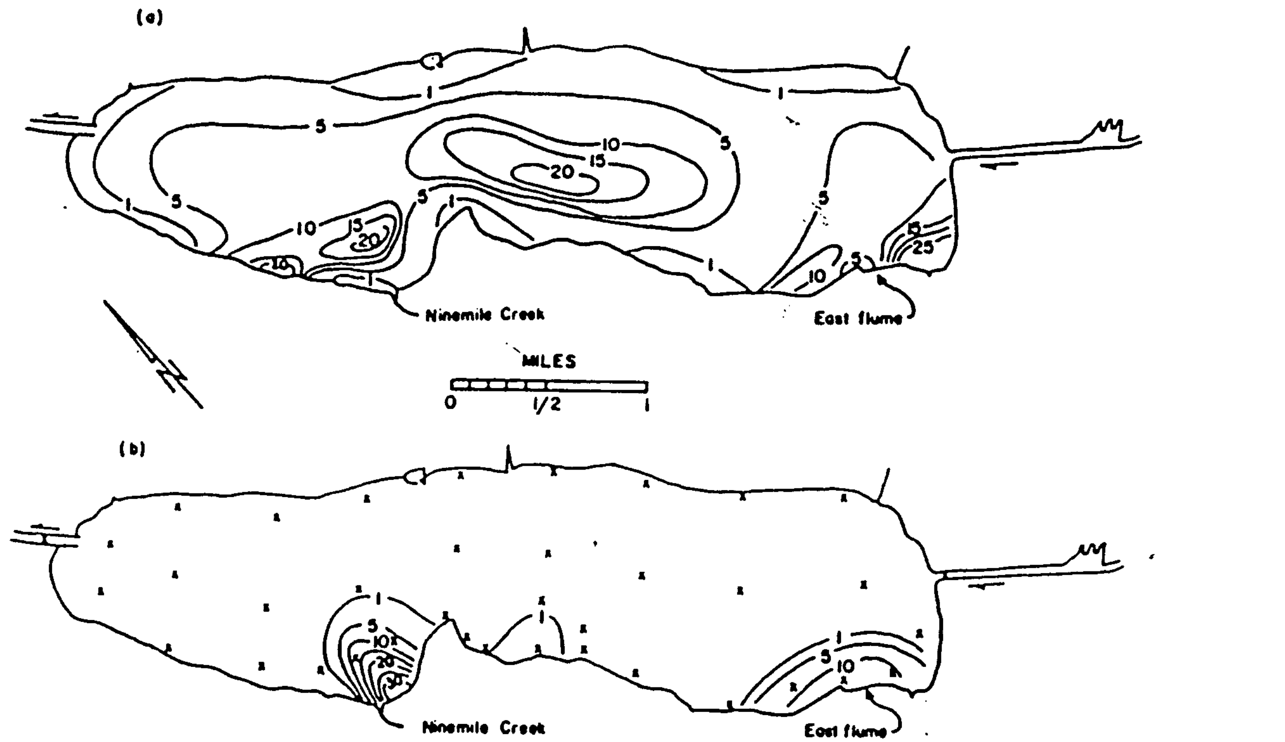



Figure EA-6 - Location of Oncolites and $CaCO_3$ Delta Deposits in Onondaga Lake

SOURCES: (1) U.S.G.S. Quad Maps
(2) (Effler) The Impact of a Chlor-Alkali Plant on Onondaga Lake and Adjoining Systems.

Figure EA-7 - Location of Mercury Contamination in Onondaga Lake




Contours of total Hg (mg/kg) in the sediments of Onondaga Lake in 1970: (a) depth of 7.5 cm and (b) depth of 30 cm, with core sample locations (USEPA, 1973).

SOURCES: (1) (Effler) The Impact of a Chlor-Alkali Plant on Onondaga Lake and Adjoining Systems.

| |
|---|
| ONONDAGA LAKE - SYRACUSE, N.Y. |
| Mercury Contamination |
| U.S.A.C.O.E. BUFFALO, N.Y. |

1.3.7 The problems and needs associated with Onondaga Lake are significant and complex. Much has been accomplished to understand the problems and relationships, but much more work at the species levels need to be done. The Onondaga County Department of Drainage and Sanitation has been monitoring the water quality in Onondaga Lake. Table EA-3 depicts Onondaga Lake yearly volume-averages concentrations in 1987 in the epilimnion (upper) and hypolimnion (lower) level of the lake and averaged in 1989 for various water quality parameters as compared to water quality standards as noted. Much has been accomplished in reducing discharge pollutants (i.e., improvements to sewage treatment plants, closure of polluting facilities, or improvements to standards of discharge facilities, etc.) with associated improvements to water quality; but more needs to be done. Even if pollution discharges are controlled and water quality improves, residual pollutants in the sediments may be a problem via recycling of sediment pollution precipitates back into the water.

## 1.4 PLANNING OBJECTIVES

1.4.1 The Federal objective of water and related land resources project planning is to contribute to National Economic Development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

1.4.2 Some of the study specific goals or objectives developed and utilized by the planning group in plan formulation and evaluation considering engineering, economic, environmental, and social acceptability factors include:

a. To facilitate, where possible, prevention of pollution and clean-up of Onondaga Lake water and sediment quality in order to facilitate future community economic and social well-being and environmental quality.

b. To reduce health and safety hazards associated with pollution in Onondaga Lake during and via clean-up measures.

c. To consider and to minimize any adverse impacts to other water resource interests during and via clean-up measures.

d. To protect and enhance, where possible, the fish and wildlife resources (habitat) in the project vicinity (particularly lake/stream and river interface characteristics) in order to protect or enhance community economic, natural environment, and social well-being.

e. To protect or enhance system erosion/siltation characteristics (avoid erosion/siltation damages and/or additional maintenance dredging) in order to protect or enhance community economic, natural environment, and social well-being.

Table EA-3a - Onondaga Lake Yearly Volume - Averages Concentrations in 1987 for Various Water Quality Parameters

## ONONDAGA LAKE
## YEARLY VOLUME-AVERAGED CONCENTRATIONS
## 1987

| PARAMETER | Upper Level EPILIMNION CONCENTRATION | Lower Level HYPOLIMNION CONCENTRATION |
|---|---|---|
| Na | 251. | 248. |
| Ca | 191. | 208. |
| Zn | .010 | .013 |
| Pb | .020 | .021 |
| Cr | .008 | .008 |
| Cu | .011 | .013 |
| Cd | .005 | .005 |
| Hg | .2 | .2 |
| Total Coli | 633. | 621. |
| Fecal Coli | 67. | 38. |
| TOC | 6.4 | 6.2 |
| TIC | 33.7 | 46.8 |
| Fil. TOC | 5.8 | 5.7 |
| Ortho P | .095 | .403 |
| TIP | .146 | .454 |
| BOD 5 | 5.5 | 9.4 |
| DO | 8.2 | 3.3 |
| Temp. | 14.8 | 9.1 |
| Spec.Con. | 2564. | 2659. |
| Cl | 623. | 629. |
| NH3-N | 2.2 | 4.4 |
| Org-N | 1.4 | 1.8 |
| TKN | 3.6 | 6.1 |
| NO3-N | .93 | .35 |
| NO2-N | .28 | .12 |
| pH | 7.5 | 7.3 |
| SO4 | 173. | 164. |
| Secchi depth | 1.3 | N/A |
| Total Alk. | 153. | 200. |
| CO2 | 7.8 | 18.1 |
| Part. TKN | .5 | .7 |
| Fil. TKN | 3.0 | 4.5 |
| Susp.Solid | 7.4 | 5.6 |
| Vol.S.Solid | 6.2 | 4.8 |
| Chlyp.-A | .025 | .007 |
| SiO2 | .96 | 2.1 |
| Phaeopig. | .010 | .005 |
| Total Solid | 1661. | 1706. |
| Vol.T.Solid | 304. | 333. |
| Fecal Strep | 67. | 81. |
| Sol.TIP | .097 | .317 |

UNITS mg/l except for the following:

| | | | |
|---|---|---|---|
| TEMP | - degrees Celsius | FECAL STREP | - cells/100 ml. |
| pH | - standard units | SPECIFIC COND. | - micromhos/cm |
| TOTAL COLI | - cells/100 ml. | SECCHI DEPTH | - meters |
| FECAL COLI | - cells/100 ml. | MERCURY | - ug/l |

Source:OCOLMPAR

Table EA-3b - Onondaga Lake Yearly Volume - Averages Concentrations of Various Water Quality Parameters As Compared to Water Quality Standards

| PARAMETER | 1989 Existing Peak Average [] | Suitable For Swimming Goal | Acceptable Cold Water Fishery Goal | Drinking Water Supply Source Goal |
|---|---|---|---|---|
| Secci Depth | 3.3' / 5.2' | 4'(4) | _ | _(+) |
| Total Coliform | 251 | <2400/100ml(4) | _ | _(+) |
| Fecal Coliform | (#) | 200/100mg(4) | _ | _(+) |
| Ammonia (hypolimnion) | 6.0 / 3.6 | _ | 2.06mg/l (1,8) / 0.27mg/l (5) | 2.06mg/l (2,8) |
| DO (hypolimnion) | 0.0 / 7.5 | _ | 6mg/l (1) | 5mg/l (2) |
| Mercury | .2ppb | _ | 0.002mg/l(1,*) | 0.002mg/l (1,?, *) / 0.005mg/l(2) |
| Nitrite | .72 / .182 | _ | 0.02 mg/l(2) | 10 mg/l(1,2,7) |
| Nitrate | 5.0 / 1.49 | _ | _ | 10 mg/l(1,2,3,7) |
| Sodium | 255 / 200 | _ | _ | <20mg/l(1,2,6) |
| Calcium (hypolimnion) | 190 / 159 | _ | _ | _ |
| Zinc (hypolimnion) | .065 / .024 | . | 0.03 mg/l(1) | <0.3 mg/l(1,2) / 5 mg/l (3) |
| Cadmium (hypolimnion) | .013 / .003 | _ | _ | <.01mg/l (1,2,3) |
| Copper | .07 / .020 | _ | _ | <.2mg/l(1,2) / 1mg/l (3) |
| Chloride | 510 / 458 | _ | 250 mg/l (1) | 250 mg/l(1,2,3) |

1. Water Quality Standards and Guidance Values, DEC 9/25/90
2. New York State DEC Codes, Rules and Regulations Section 170.4
3. Chpt I State Sanitary Code, subpart 5-1 Public Water Supplies 1/19/90
4. Chpt I State Sanitary Code,subpart 6-2 Bathing Beaches 3/30/88
5. Defined by UFI
6. From 3 No designated limits <20 mg/l for severely restricted Na diets <270 mg/l for moderately restricted Na diets
7. Nitrate & Nitrite in combination
8. Total NH3-N at pH-7.25 & Temp-20°C, unionized value- 0.0144mg/l

* Guidance value is 0.0002mg/l
\+ Not considered, easily treatable
\# Not specified, too variable

Source:CENCBPE-HO

f. To protect or enhance aesthetics in the project vicinity in order to protect or enhance vicinity and community economic, natural environment, cultural, and social well-being.

g. To protect or enhance significant water related recreational resources and access in the project vicinity in order to protect or enhance vicinity and community economic, cultural, and social well-being.

h. To protect or enhance significant cultural resources in the project vicinity in order to protect or enhance vicinity and community cultural heritage, and social well-being.

i. To encourage wise water and land use practices around lake, consistent with wise development, health and safety, environmental principles to protect future community economic social well-being and environmental quality.

## 2. ENVIRONMENTAL SETTING

This section briefly summarizes the human (man-made) resources, cultural resources, and natural resources environmental setting of the project vicinity.

### 2.1 HUMAN (MAN-MADE) RESOURCES ENVIRONMENT

2.1.1 Community and Regional Growth:

2.1.2 Location. Syracuse and Onondaga Lake are located in Onondaga County in central New York approximately 195 miles northwest of New York City, 125 miles west of Albany, 140 and 75 miles east of Buffalo and Rochester respectively, and 115 miles southwest of the Adirondack Region (Figures EA-1). Syracuse is a major metropolitan area in New York State. In part, because of its centralized location, Syracuse has developed commercially and industrially. Like many of the older industrial and commercial cities in the northeast, Syracuse is presently undergoing redevelopment, however, with increased emphasis on environmental, recreation, and quality of life parameters. The clean-up of Onondaga Lake, polluted over years of dumping municipal and industrial wastes, has become a focal point of these redevelopment efforts and is expected to serve as an example and asset to community redevelopment efforts.

2.1.3 Brief History. Onondaga Lake was the Council Fire site for the Iroquois Nation, figured in the Revolutionary War, was settled in post-Revolutionary War times, and saw salt industry develop along its southeastern shore. As time passed, the Erie Canal was built, the lake level was lowered, the city of Syracuse was chartered, recreational and commercial development accelerated, and the Industrial Revolution occurred. Soon, raw sewage and industrial wastes were discharged directly into the lake. Water levels continued to drop with increased water usage. World War I accelerated industrial activity. Planning, park, and

reclamation activities surfaced. Then with World War II, production once again became a priority.

2.1.3.1 Gross pollution and loss of recreational, fishery, and aesthetic values were the inevitable result. Postwar pollution abatement programs were developed, with Federal environmental activities expanded in 70's, and the Metropolitan Sewage Treatment Plant (METRO) was built. Rehabilitation efforts continue to this day fueled by public interest, environmental concerns, lakeshore development, industrial waste shutdown, and the Oil City-Carousel Mall development (Hennigan 1989).

2.1.3.2 Table EA-4 lists some historic, developmental, pollution related, recreational, and clean-up related events to provide a historic overview of events in the Onondaga Lake vicinity. The symbols preceding the listed event identify the nature of the event for easier specific subject tracking. Reference the following table and key to symbols (Hennigan 1989).

2.1.4 Population. The population in the Onondaga Lake watershed is approximately 450,000. Table EA-5 depicts existing and anticipated population figures for Onondaga County, the City of Syracuse, the Towns of Salina and Geddes, and the Village of Solvay which encompass the lake (Figures EA-8 & -9) (U.S. Dept. of Commerce, 1994).

2.1.5 Generally, moderate population growth is anticipated for the Onondaga County vicinity in the near future.

2.1.6 Proposed Project. The proposed project was authorized by the Congress under Section 410 of Public Law 101-596. The U.S. Army Corps of Engineers is cost sharing the project with a non-Federal sponsor 70 percent to 30 percent. The Corps is involved with the design aspect of the project only. The Canal Corporation will be responsible for the construction and the operation and maintenance portions of the proposed project. Brief description:

a. Dredging. Original project plans called for the dredging of the entire Inner Harbor Terminal Area which would have encompassed a 100 foot bottom wide channel, 12 feet deep, 2H:1V side slopes. The dredged material wet volume which did not include additional water for hydraulic dredging was estimated at 207,000 cubic yards. The revised proposed project dimensions call for a 60 foot bottom wide channel, 10 feet deep, 3H:1V side slopes, with only the first northern-most Inner Harbor terminal slip being dredged. It is now estimated there will be 60,000 cubic yards of wet volume dredged material. The dimensions were modified due to the lack of disposal area and at the request of the New York State Canal Corporation.

## Table EA-4 - Historic Overview of Events in the Onondaga Lake Vicinity

Table Development Time Line

| Symbols | Date | Event |
|---|---|---|
| H,D | 1654 | Fr. Simon LeMoyne French Jesuit Missionary. Onondaga L. Onondagas. Salt Springs. |
| H,D | 1656 | St. Marie De Gannentaha Mission. |
| H,D | 1696 | French under DeFronteac defeat the Onondagas. |
| H,D | 1779 | Washington sends General Sullivan to fight the Iroquois Nation. |
| H,D | 1783 | Revolutionary War ends. Land grants. |
| H,D | 1786 | Trading post established at south end of Onondaga Lake by Ephraim Webster. |
| H,D,P1 | 1788 | Fort Stanwik Treaty (Salt Spring Access). |
| D,P1 | 1793 | Commercial Salt production on Lake. |
| D,P1 | 1804 | Salt production (100,000 bushels/year). |
| D | 1822 | Lake elevation lowered by canal commissioners; drains wetland at south end of Lake. |
| H,D | 1825 | Erie Canal Completed. |
| H,D | 1883 | First railroads to Syracuse. |
| H,D | 1848 | Syracuse Incorporated as a City. |
| H | 1850 | Harvey Balwin, first mayor of Syracuse (Onondaga Lake Hanging Garden Speech). |
| D,P1 | 1862 | Salt production peaks at 9M bushels/year. |
| H,D,RR | 1872 | Lake View Point Hotel opens (west shore of Lake) |
| D,RR | 1878 | Access road to west shore of lake. |
| D | 1881 | Solvay Process Company Formed. |
| D,P1 | 1884 | Solvay begins soda ash production. Waste residual to nearshore lands at southern end of Lake and Lake itself. |

Key to Symbols

H - Historic

D - Development

P - Pollution Related

PS - Pollution Sewage
PI - Pollution Inorganic Salts
PM - Pollution Heavy Metals
PB - Pollution Benzenes

R - Recreation Related

RR - Recreation Resorts
RS - Recreation Swimming
RF - Recreation Fishing
RP - Recreation Parks

LA - Legislative/Legal Action

Table EA-4 Cont'd

| Symbols | Date | Event |
|---|---|---|
| D,P1 | 1887 | Solvay process solution mining of salt (-1,500'(+/-) depth) in Tully Valley of Onondaga Creek, 15 miles south of Syracuse. |
| D,PM,PB | 1890 | Other major industries - steel, machinery, pottery. |
| D,RR | 1890 | Recreational development of west shore continues. |
| D,PS | 1996 | Sewers built in city. Sewage flows directly into Onondaga Creek and Harbor Brook. |
| P,RF | 1897 | White fish disappears. |
| D,P | 1900 | Ice harvesting banned (health). |
| D | 1904 | Skaneateles Lake water supply. |
| PI,LA | 1907 | State Attorney General threatens legal action. Solvay Process agrees to dump waste residual only on shore and bulkheaded area. |
| D,PS | 1907 | Syracuse interceptor sewer board established to clean up Onondaga Creek and Harbor Brook. |
| D,P1,PB | 1918 | Solvay Process chlorinated benzene plant. Still bottoms and waste residuals lagooned on site. |
| P,RR,RS,RF | 1920 | Recreational use declines due to pollution. |
| D,P1,PS | 1921 | City and Solvay Process Company agreement. Company use of point opposite fairgrounds for wastebeds. City disposal of sewage sludge on wastebeds closer to city. |
| D,PS | 1922 | Interceptor sewers. Untreated sewage to Lake. |
| D,PS | 1925 | Primary sewage treatment plant. Effluent to Lake, sludge to Solvay wastebeds. |
| D,RP | 1932-1936 | East shore park and parkway built via abandonment of salt production facilities. |
| P,RS | 1940 | Swimming banned. |
| P1,PS | 1943 | Wastebeds collapse flooding Lakeland neighborhood and fairground with soda ash. |
| P | 1947 | State Health Department Study sites seriousness of pollution and recommends attention. |
| D,P1,PM | 1950 | Allied (Solvay) chlorine via mercury cell process. |
| PS | 1950 | Allied strike leaves city with no sludge disposal. Untreated sewage to Lake. Four years. |
| P,R | 1950 | Lake bottoms out. Odorous and unattractive. No swimming or fishing. Sewer and industrial waste. |
| P,LA | 1952 | Lake surveyed. Waters classified for fishing and swimming via State water pollution control law. |
| D,P1 | 1953 | Allied deed 400 acres of wastebeds to State for State Fair parking and highway. |
| D,PS | 1955- | County metropolitan sewer district. |
| D,PS | 1960 | New primary treatment plant. Sludge to Allied wastebeds. |
| P,LA | 1968 | Federal Study classifies Lake as most polluted body of water in L. Ontario basin. |
| PM,LA,RF | 1970 | Mercury discovered in Lake fishery. U.S. Attorney General sues Allied to stop mercury discharge. Fishing prohibited (mercury contamination). |
| PS | 1971-1982 | Special Lake studies. Most pertain to sewage effluents. |
| D,RP | 1975 | Environmental action plan for lakeshore trail adopted by county. Implementation started. |

Table EA-4 Cont'd

| Symbols | Date | Event |
|---|---|---|
| D,PM,PB | 1975 | Crucible Steel new wastewater treatment and recycling plant. |
| PI,PM | 1976 | Mercury production facilities sold by Allied to Lyndon Chemicals and Plastics (LCP). |
| PB | 1977 | Allied closes benzene operation. |
| D,PS | 1979 | Metro sewage treatment plant expanded to secondary/tertiary treatment. Sludge to Allied wastebeds. |
| D,PI,PS | 1979 | Allied wastebed overflows directed to Metro treatment plant to aid in precipitating phosphorous. Problems. 90% (+/-) of waste discharged to Lake. |
| P,LA | 1985-1986 | Onondaga Lake management study. Technical analysis (Lake, sewage, industrial waste). Recommends extensive study and temporary State Commission. |
| PI | 1985 | Allied announces plans to close down the Solvay operation. |
| PI,PS | 1986 | Allied (Solvay) ceases operation and initiates dismantling. |
| P,LA | 1986 | Onondaga Lake Commission proposed by County Bill (Lombardi). Governor rejects Commission and proposes an Onondaga Lake Advisory Committee. |
| P,LA | 1986 | Onondaga Lake Advisory Committee created by Governor through the Commissioner of DEC. |
| D,PS | 1987 | Interceptor sewer best management practices project completed; combined sewer overflows reduced 90%. |
| P,LA | 1987 | Onondaga Lake Advisory Committee adopts "Salmon 2000." |
| D,RP | 1987 | County Parks initiates Lakeshore extravaganza program. Annual event (July, August). |
| PM,LA | 1988 | LCP Corp cited by DEC for mercury releases. Fined. Plant closes. |
| PS,LA | 1988 | Atlantic States Legal Foundation complaint against Onondaga County Department of Drainage and Sanitation alleging violation of SPDES permit. Suit joined by Attorney General and Commissioner of DEC. |
| P,LA | 1988 | Onondaga Lake Restoration Act introduced (U.S. Senator Moynihan). |
| D | 1988 | City of Syracuse and Pyramid Co. announces major lakeshore redevelopment to transform southern shoreline and terminal area to commercial and residential. |
| H,D,RP | 1988 | County Parks announces St. Marie redevelopment project (east side of Lake). |
| D,RP | 1988 | County Parks contract to finish design of Lakeshore trail. |
| PS,LA | 1989 | Judgement on Onondaga County case with abatement schedule. |
| D,PS | 1989 | County contract for Liverpool and Ley Creek pump station raw sewage overflows. |
| P,LA | 1989 | Governor Cuomo's State of the State message. Restoration of Lake by 2000. |
| P,LA | 1989 | Onondaga Lake Restoration Act of 1989 introduced (U.S. Senator Moynihan). Hearings held in Syracuse. |
| P,LA | 1989 | State Attorney General and DEC Commissioner complaint against Allied-Signal Corp. for pollution violations and resource damage. |
| P,LA | 1989 | Onondaga Lake Advisory Committee "Salmon 2000" conference. |
| P,LA | 1989 | Congressional appropriations bill. EPA to create a management conference. COE to begin planning effort. |

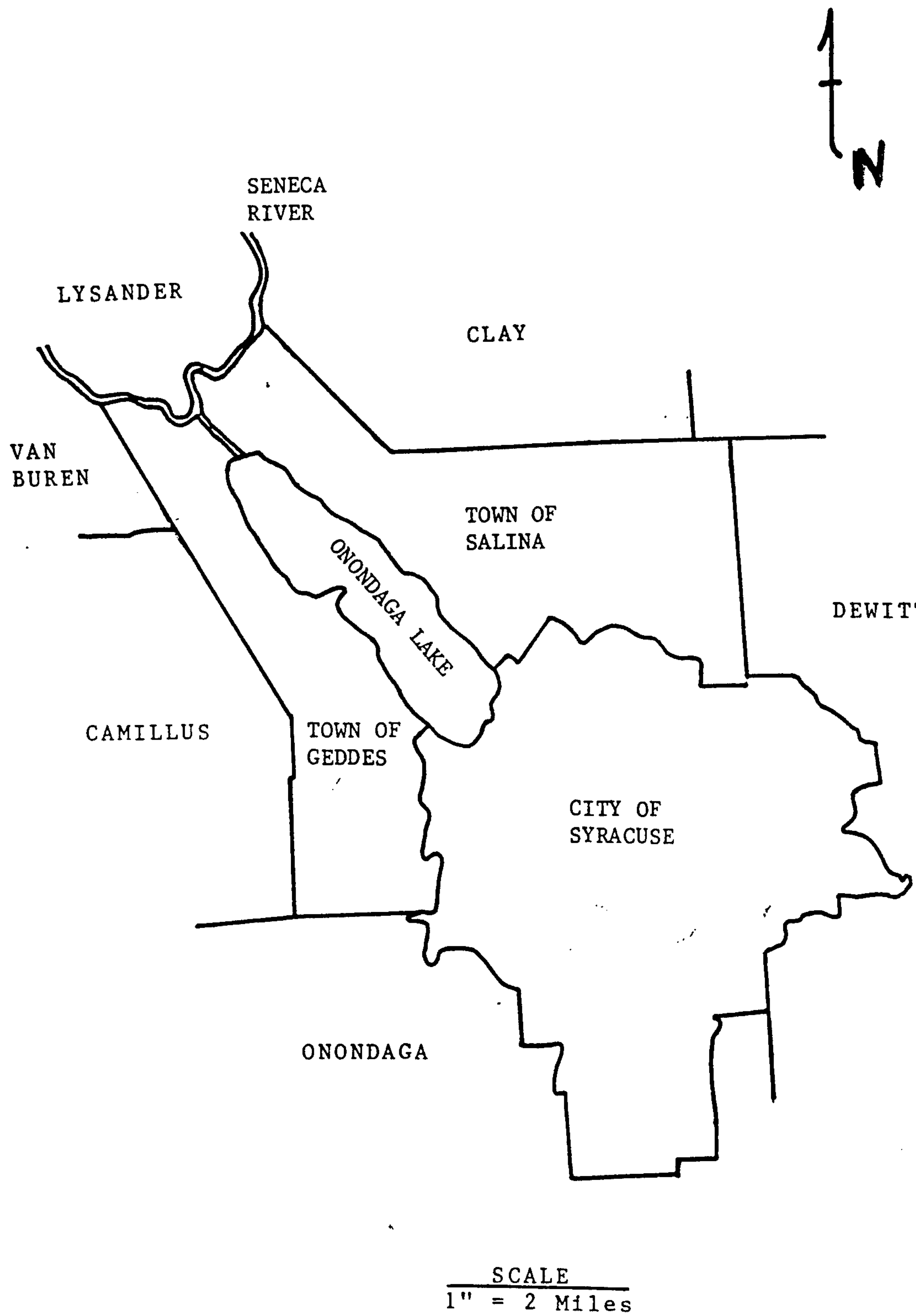
(Hennigan 1989)

Table EA-5 - Population.

| | YEAR AND CHANGE | | | |
|---|---|---|---|---|
| Location | 1980 | 1990* | 2000 | 2010 |
| Onondaga Co. | 463,920 | 463,801 | 473,814 | 482,729 |
| Syracuse (City) | 170,105 | 160,950 | 159,300 | 158,950 |
| Salina (Town) | 37,400 | 35,650 | 35,300 | 35,050 |
| Geddes (Town) | 18,528 | 18,000 | 17,600 | 17,650 |
| Solvay (Village) | 7,140 | 6,900 | 6,750 | 6,600 |

Sources: -Population Projections, NYS Water Quality Management Plan, NYS Dept. of Environmental Conservation, 1985.

-Bureau of Census; County and City Data Book, U.S. Dept. of Commerce, 1994.




SOURCE: Onondaga County Highway Map

FIGURE EA-8

ONONDAGA LAKE - SYRACUSE, N.Y.

Onondaga Lake Vicinity

U.S.A.C.O.E. BUFFALO, N.Y.

b. Disposal. The dredged material wet volume of approximately 60,000 cubic yards will be placed in the confined disposal Facility (CDF) UDS 5-19 located adjacent to the Inner Harbor area. The dredged material is expected to reduce by one third, resulting in about 40,000 cubic yards of dry material. These estimates do not include additional water from hydraulic dredging. Water from hydraulic dredging will add between two and three times the volume (120,000 to 180,000 cubic yards or up to 36 million gallons). Design of the effluent control structure requires at least a two feet deep pool below the bottom height of the weir. Design of the dikes will also require two feet of freeboard in order to minimize wave action.

2.1.7 The U.S. Army Corps of Engineers, Buffalo District has sampled the harbor sediments within the project area. The analysis of the sediments was coordinated with the NYSCC, U.S. Environmental Protection Agency (USEPA), New York State Department of Environmental Conservation (NYSDEC), and other interests. See Section Appendix EA-B (Section 401 b-1 Evaluation) for results.

2.1.8 Water and Land Use Development. The Onondaga Lake watershed is approximately 240 square miles in area and lies almost entirely within Onondaga County, New York. Current land use within the watershed is approximately 33 percent cropland, 28 percent urban, 22 percent woodland, and 17 percent open and special uses.

2.1.9 Onondaga Lake is approximately 4.5 square miles in area (about 4.5 miles long and up to a mile wide) and up to 65 feet deep.

2.1.10 The Ninemile Creek watershed is about 125 square miles which is primarily rural agricultural in the upper watershed (beginning at Otisco Lake) and urban, industrial, and commercial at the outlet. The Onondaga Creek watershed is about 115 square miles which encompasses much of the City of Syracuse and extends south into Tully Valley. The Ley Creek watershed is about 30 square miles which is primarily residential and industrial with some agricultural. The Harbor Brook watershed is about 11 square miles, the upper part of which is primarily agricultural, with some urban run-off in the lower reaches.

2.1.11 The Onondaga Lake shoreline is approximately 12.2 mile long (Figure EA-9). About 9.5 miles or 78 percent is publicly owned, primarily by Onondaga County with a small amount owned by the City of Syracuse. About 2.7 miles or 22 percent is in private ownership, primarily by Conrail, Allied Signal Corporation, Crucible Steel, and Niagara Mohawk Power Corporation.

2.1.12 The county owned property is primarily perimeter parkland located along the northwest, north, and northeast perimeter of the lake. Developments include a hiking/biking path (eventually to perimeter the entire lake), a marina, a salt manufacturing museum, picnic areas, play grounds, and ballfields. The city owned property is primarily commercial and industrial development, but redeveloping to mixed development, located along the southwest,

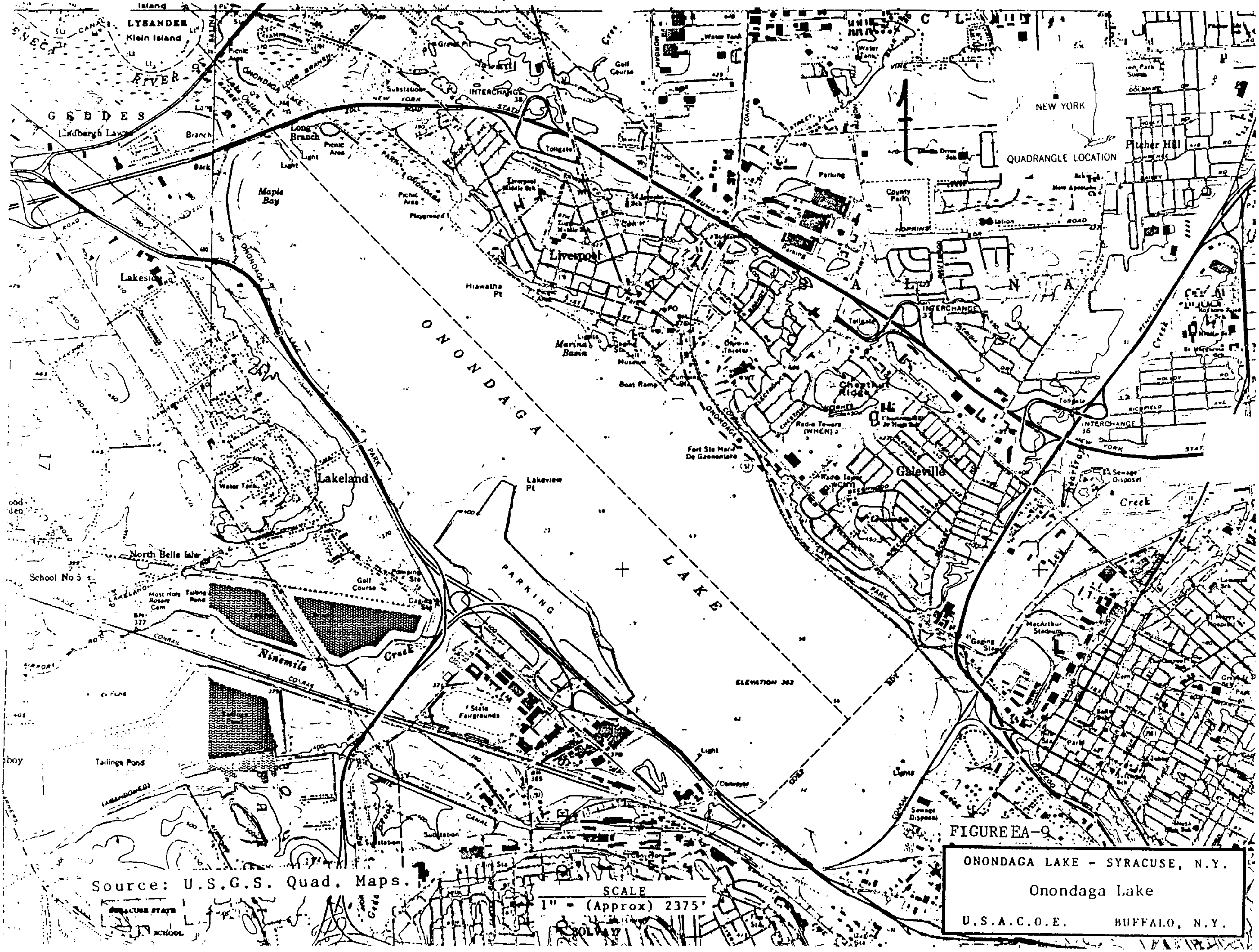



FIGURE EA-9

ONONDAGA LAKE - SYRACUSE, N.Y.

Onondaga Lake

U.S.A.C.O.E. BUFFALO, N.Y.

Source: U.S.G.S. Quad. Maps.

SCALE
1" = (Approx) 2375'

south, and southeast perimeter of the lake. The private property is primarily industrial development located along the southwest, south, and southeast perimeter of the lake.

2.1.13 The State Fairgrounds is also located in this latter vicinity. Parking is located on an old industrial soda ash disposal area. Immediate perimeter upland developments are primarily transportation and mixed urban developments. Syracuse proper is located just south of Onondaga Lake.

2.1.14 Several redevelopment projects are underway in the Onondaga Lake vicinity. On the south end of the lake, the Carousel Mall was completed in the fall of 1990. Other mixed developments, primarily commercial, residential, and recreational are being considered to replace old oil storage and warehouse areas no longer utilized. Residential and commercial development in Franklin Square, primarily an old warehouse district, is underway. The St. Marie De Cannenthaha Living History Site - formally the site of a 1656 era French Jesuit mission and fort - on the northwestern shore of Onondaga Lake is undergoing renovation.

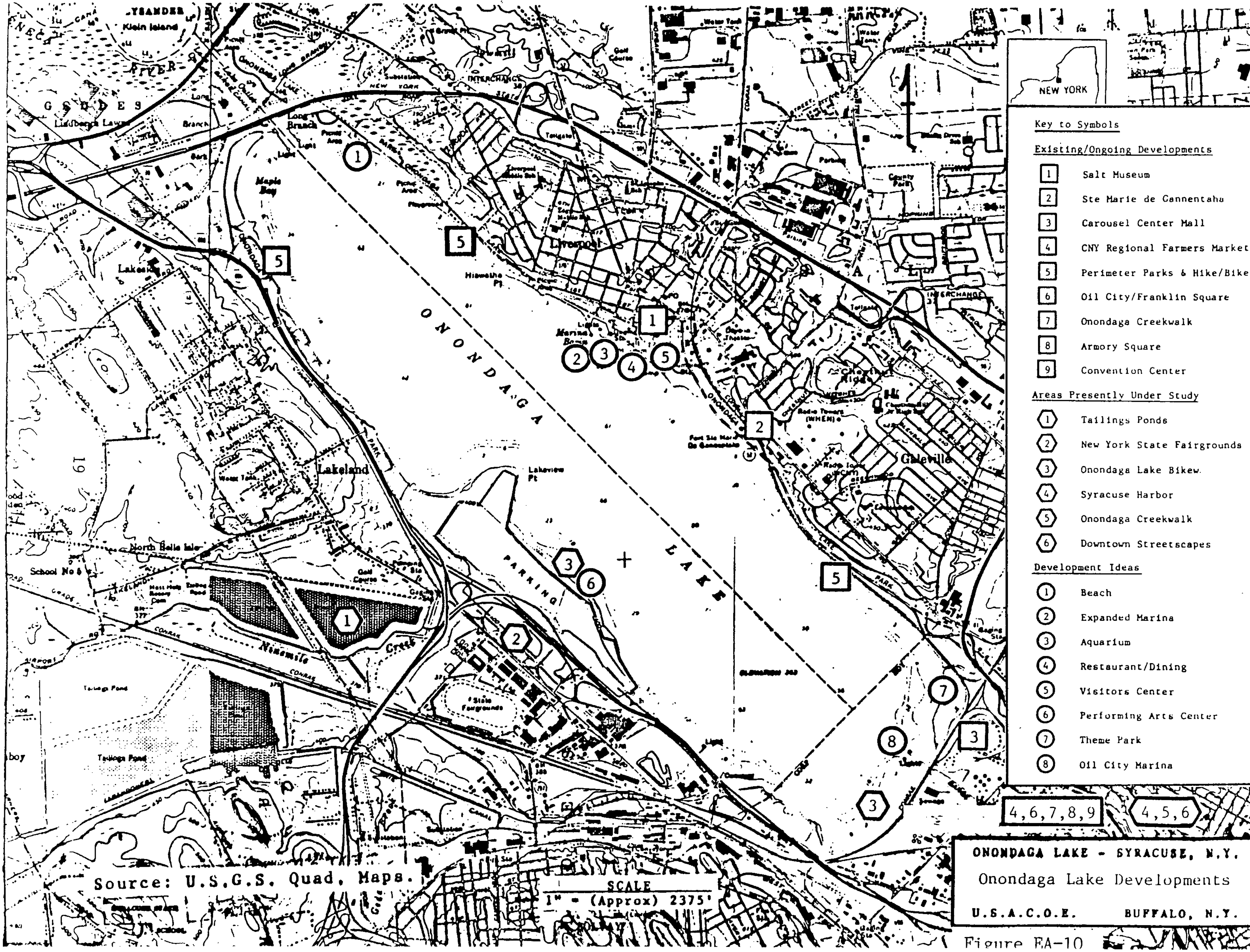
2.1.15 Other potential developments being considered for the future include: a beach development, expanded marina, an aquarium, restaurant/dining area, visitors center, performing arts center, theme park, and an Oil City Marina (Figure EA-10).

2.1.16 Business and Industry; Employment and Income: In 1987, there were some 10,325 business establishments in the Onondaga County area. Most of these establishments pertained to wholesale and retail businesses (35%), and service businesses (34%), followed by: construction (12%), transportation, public utilities, finance, insurance, and real estate (11%), and manufacturing (6%) (U.S. Dept. of Commerce, 1994).

2.1.17 In 1991, of the 238,758 labor force (covered by unemployment insurance) in Onondaga County, there was an unemployment rate of 5.6%. This compared with an unemployment rate of 7.2% for New York State. The leading employment sections included: manufacturing (22%); service industries (28%); retail trade (20%); followed by: finance; insurance; real estate (9%); wholesale trade (8%), transportation; communication, and public utilities (7%); other (6%), and construction (5%). Primary manufacturing employment industries in Syracuse and Onondaga County vicinity include: electric and electronic machinery, machinery, transportation equipment, food and kindred products, printing and publishing, other, chemicals and allied products, primary metals, and instruments (U.S. Dept. of Commerce, 1994).

2.1.18 In 1989, the per capita income for Onondaga County vicinity was $14,703. This compared to $16,501 for New York State (U.S. Dept. of Commerce, 1994).

2.1.19 Generally, moderate growth in business, employment, and income is expected for the area.




ONONDAGA LAKE - SYRACUSE, N.Y.

Onondaga Lake Developments

U.S.A.C.O.E. BUFFALO, N.Y.

Figure FA-10

2.1.20 Public Facilities and Services: The project vicinity is adjacent to the City of Syracuse and the Towns of Salina and Geddes urban development areas. Area public utilities, facilities, and services are generally good and readily available.

2.1.21 Water - Communities in the project vicinity generally obtain their community water supplies through the Onondaga County Water Authority who in turn obtain their water supply from the Metropolitan Water Board. The primary source of water is Lake Ontario. Supplemental sources of water include: Otisco Lake, Skaneateles Lake, and Ray Dam.

2.1.22 Sewage Disposal - The U.S. Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC) are primarily responsible for permitting and monitoring point source effluent discharges to New York State waters. The Syracuse Metro Sewage Treatment Plant is now a tertiary treatment plant with a design flow of about 80 million gallons per day which discharges into Onondaga Lake. Additionally, the County has implemented a best management plan (BMP) which has eliminated some of the combined sewer overflow (CSO) pollution problems which periodically occurred when storm sewer run-off combined with sewage allowing some sewage to bypass the sewer treatment process and be discharged directly into the lake. Some special or additional treatment measures and facilities still need to be considered in order to address associated pollution problems to Onondaga Lake. USEPA, NYSDEC, Onondaga County, and the City of Syracuse are working to solve these additional problems including the Onondaga Lake CSO Project (O'Brien and Gere, 1987).

2.1.23 Tributaries which flow into Onondaga Lake receive urban and rural run-off and point source effluent discharges from municipal and industrial sources. Ninemile Creek receives treated wastewater from the village of Camillus and Marcelles and overflow and infiltration from the wastebeds of Allied Chemical Corporation. Forty-five combined sewer overflows discharge to Onondaga Creek. Two CSO's enter Ley Creek. Harbor Brook receives discharge from 19 CSO's. Tributary 5A receives treated wastewater from Crucible Steel. Bloody Brook receives no significant pollutant point sources with the exception of some treated coolant and wastewater from the General Electric Corporation's Park Complex. Sawmill Creek receives no significant pollutant point sources (Effler, S.W., 1987).

2.1.24 Utilities - The project area is located in close proximity to the City of Syracuse and utility services including: water, sewer, gas, electric, and telephone are readily available.

2.1.25 Transportation - Onondaga Lake is a branch of the Seneca River and a portion of the New York State Canal System terminating in Syracuse. The system now services primarily recreational vessels. A maintenance office and terminal is still located on the east side of the Inner Harbor along Onondaga Creek.

2.1.26 Syracuse, being located in central New York State, has historically, served as an interchange location, first for the Canal System, and presently for the New York State

Thruway System, which closely parallels the major routes of the old Barge Canal System. Major thoroughfares closely perimeter Onondaga Lake with Interstate 90 and Route 81 to the north and east, and Route 690 to the south and west. Syracuse proper is located immediately south of Onondaga Lake. local access roads perimeter the lake (Figure EA-1).

2.1.27 Police and Fire Protection - The project vicinity is serviced by local village, town, and city police. These services are also supplemented by the county sheriffs department and New York State Police. Similarly, the project vicinity is serviced by local village, town, and city fire departments.

2.1.28 Property Values and Tax Revenues: The average value of farmland (land and buildings) for Onondaga County is estimated at $1,614 per acre. The median value of occupied housing units in Onondaga County is roughly estimated at $70,000. Onondaga Lake is situated in close proximity to the City of Syracuse in Onondaga County. Property values may vary greatly depending on site, demand, aesthetics, etc. Local tax revenues generally include revenue sharing (Federal, State, Local), and local property, service district, and sales taxes (U.S. Dept. of Commerce, 1994).

2.1.29 The Onondaga Lake vicinity is undergoing redevelopment with increasing property values and associated tax revenues. Most of the immediate Lake perimeter property will remain County owned.

2.1.30 Noise and Aesthetics: No significant adverse noise problems or sources were noted in the immediate project area. The major source of noise is generated from the movement of vehicular traffic along major thoroughfares. Noise was also noted from the operation of construction vehicles and equipment in the redevelopment construction areas in the City of Syracuse vicinity at the southeast end of the Lake, but these impacts are only temporary. Some industrial noise was also noted along the industrial developed southwest perimeter portion of the Lake.

2.1.31 The lake vicinity provides a varied assortment of aesthetic experiences depending on location ranging from views of industrial waste sites, to urban redevelopment, to park views of the Lake and recreational craft on it. A close look to the Lake itself reveals an almost mystic milkish color, and sediment coating with calcium carbonate and associated precipitate pebbles. The park shoreline are very pleasing in a generally urban setting and receives heavy use.

2.1.32 Community Cohesion: The project area has long been developed and has a long history of changing developments with the times; from the Iroquois Indians, to the Revolutionary War, to salt production, to the Barge Canal, to the resort era, to the Industrial Revolution, to the environmentally consciousness.

2.1.33 Recreation: Approximately 42 percent of the 12-mile lake perimeter is parkland developed by Onondaga County (Figure EA-9). The parklands are primarily located along

the northwest, north, and northeast perimeter of the lake. Developments include a hiking/biking path (eventually to perimeter the entire lake), and 80 slip marina with boat launching ramp, a salt manufacturing museum, picnic areas, playgrounds, and ballfields.

2.1.34 With continued community and industrial developments and associated pollution, primarily in the late 1800's and early 1900's, water and sediment quality degraded in the lake until swimming was banned (approximately 1940) and consumption of fish from the lake was not recommended. Although measures have been taken to improve water quality and to some degree sediment quality, swimming is still banned and consumption of fish from the lake is still not advised today (Sloan, R.J., 1981). Fish consumption advisories pertain to potential bio-accumulation of mercury within the fatty tissues of the various fish species found in the lake (Sloan, R.J. et. al., 1987).

2.1.35 The primary exceeded parameters resulting in the swimming ban is high turbidity (transparency is generally less than 4 feet) which is due to high concentrations of phytoplankton, calcium carbonate, and clays; and frequently violated fecal coliform standards following high runoff events, primarily as a result of combined sewer overflows. Additional concerns pertain to pollution of water and sediments with metal and organic pollutants for which there may be no established "safe for swimming" standards (Effler, S.W., 1988).

2.1.36 The demand for recreational development of the lake is particularly strong since the lake is located at the northern boundary of the City of Syracuse, a significant urban area of New York State. The New York State Comprehensive Recreation plan (1983) identified the following activities as high regional demand activities for which facilities development is of high priority. Activities include: swimming, boating, picnicking, hiking/biking, and tennis. The potential for development of facilities for some of theses activities around Onondaga Lake is high, particularly if water and sediment quality problems can be reduced.

2.1.37 The Onondaga Lake Park is very popular and receives heavy use. In addition to normal park activities, special events include: annual hydroplane races, the Intercollegiate Rowing Association Regatta, and the County Parks' Waterfront Extravaganza.

2.1.38 <u>Cultural Resources</u>: The Onondaga Lake vicinity has a long and interesting history of activity and development (See <u>Community and Regional Growth</u> 2.1.1). Coordination with the New York State Office of Parks, Recreation, and Historic Preservation - State Historic Preservation Officer (SHPO) indicates that the Onondaga Lake vicinity contains numerous prehistoric and historic archaeological and historic sensitive areas.

2.1.39 The considered alternative measures features would occur in primarily previously disturbed lake/river channel bottom areas and would not be expected to disturb any significant cultural resources. The State Historic Preservation Office did not identify any potential for significant cultural resource items in the immediate project impact area.

## 2.2 PHYSICAL/NATURAL RESOURCES ENVIRONMENT

2.2.1 Air Quality: For sampling stations in the Syracuse area of Onondaga County, a review of the most current available NYSDEC Air Quality - Ambient Air Monitoring System Report (NYSDEC, 1994) showed that there has been no contravention of air quality State/Federal standards recorded for: carbon monoxide; ozone; particulate matter; lead; sulfur dioxide inhalable particulate; or total suspended particulates. Therefore, ambient air quality for these parameters, up to December 1994, was recorded as being in attainment of the aforementioned standards in the Syracuse locale.

2.2.2 Water Quality: Onondaga Lake is an urban lake that is surrounded by commercial, industrial, and residential land use. The lake is adjacent to the northern boundary of the City of Syracuse, as well as the towns of Geddes and Salina in Onondaga County. The towns of Liverpool and Solvay are also located nearby. The Lake is considered to be dimictic because it generally experiences two periods of circulation (turnovers) each year. However, "chemical contributions to the density structure of the lake tend to impede the rate of mixing of Lake waters during overturn" (Onondaga County 1971). Based on best use, the current NYS water quality classification for Onondaga Lake is Class "B" northwest of a line extending from a point located on the west shore 0.25 miles northwest of the mouth of Tributary 5A, to a point on the east shore located 0.6 miles southeast of the mouth of Bloody Brook. The lake is designated as being Class "C" southeast of the mouth of Tributary 5A, to a point located on the east shore 0.6 miles southeast of the mouth of Bloody Brook. The Class "B" designation implies potential for bathing and any other uses except as a source of water for drinking, culinary, or food processing purposes. A Class "C" designation implies potential for fishing and other use except for bathing, as a source of water supply for drinking, culinary, or food processing purposes. The New York State Department of Environmental Conservation's (NYSDEC) water quality classification system is based on best designated use.

2.2.3 Over the years, the Lake has served as a water supply and receptacle for wastes for municipalities and industries. As a result, the water quality has deteriorated significantly. The discharges of municipal effluents and industrial wastes have left the lake polluted and hypereutropic. Onondaga Lake experiences anoxic conditions in its hypolimnion, very large algae crops and algal macronutrient content, and poor water transparency (Meyer and Effler 1980). Water transparency in the Lake is generally less than 4 feet due to high concentrations of phytoplankton, calcium carbonate, and clays. The fecal coliform standards are frequently violated following high runoff events primarily as a result of combined sewer overflows (CSO's), thus prohibiting swimming (Auer 1989; Auer and Niehaus 1989; Effler 1988; Heidtke 1989. The fishery is impacted on by mercury contamination of fish flesh, inadequate dissolved oxygen levels, and the losses of suitable fish habitat (Brooks and Effler, 1989; Effler, Brooks, Auer, and Doerr, 1990). Excessive chlorides make the Lake's freshwater unnaturally saline and also prevents the top and bottom waters from mixing (lake turnover), thus resulting in low or depleted oxygen levels (Flocke 1990). The oxygen depletion problem is so severe that adequate concentrations for support of fish life are often

limited to the upper 4-5 meters of the water column during the warmer summer months. During the fall mixing period, the New York State standard of 4 milligrams per liter for dissolved oxygen is violated because of oxygen-demanding reduced chemical species accumulated in the bottom waters during the summer (Effler, Hassett, Auer, and Johnson 1989; Effler, Perkins, and Brooks 1987). The high phytoplankton concentration occurs because the phosphorus and nitrogen loadings. Sources of phosphorus include the Metropolitan Sewage Treatment Plant and combined sewer overflows, internal recycling for bottom sediments and from non-point sources.

2.2.4 Since 1970, the Onondaga County Department of Drainage and Sanitation has monitored 5 of the natural tributaries to the Lake (Ley Creek, Onondaga Creek, Harbor Brook, Ninemile Creek, and Tributary 5A) as well as the Lake outlet (Stearns and Wheeler 1990). Sawmill Creek, Bloody Brook, and the Barge Canal have not been monitored over the years, but available information is still provided.

2.2.5 Ley Creek enters Onondaga Lake approximately 0.2 miles southeast of a point where the City of Syracuse line intersects the east shore of the Lake. This Creek drains a watershed area of 30 square miles east of Onondaga Lake. The majority of the watershed is residential and industrial in nature with some agricultural lands. Two combined sewer overflows enter Ley Creek. The concentrations and loads of biological oxygen demand (BOD) and indicator bacteria have varied over the course of the annual monitoring program. The variability may be due to the sanitary landfill or to the timing of the water quality sampling in relation to storm events and operation of the CSO network. The current NYS water classification designation for Ley Creek from its mouth upstream to the Ley Creek Sewage Treatment Plant sewer outfall is Class "D" (best usage for agricultural or as a source of industrial cooling or process water supply and any other usage except for fishing, bathing, or as a source of water supply for drinking, culinary, or food processing purposes). From the sewer outfall upstream to the South Branch, Ley Creek is designated as Class "B" (best usage for bathing and any other uses except as a source of water supply for drinking, culinary, or food processing purposes).

2.2.6 Onondaga Creek, located at the southeastern end of Onondaga Lake, drains a watershed area of about 115 square miles. The watershed encompasses much of the City of Syracuse and extends south into the Tully Valley. Forty-five CSO's discharge into the Creek. Based upon recent monitoring data, it appears that the water quality of the Creek is degraded with elevated concentrations of fecal coliform bacteria, salts, and the heavy metals, lead, copper, and chromium. Additionally, sources of high sediment load carried by the Creek have been identified in southern Tully Valley. The Creek flows into Onondaga Lake at the Syracuse Inner Harbor area, the proposed project location. The NYSDEC water quality classification for Onondaga Creek from its mouth upstream to Temple Street in Syracuse is Class "D"; from Temple Street upstream to Tributary 5B the Creek is designated as being Class "B"; from this tributary upstream to the source of Onondaga Creek the Classification is "C" (best usage is form fishing and any other use except for bathing, as a source of water supply for drinking, culinary, or food processing purposes).

2.2.7 Harbor Brook, which enters Onondaga Lake at the southernmost point of the Lake, drains a watershed of about 11.3 square miles, extending to the southwest of the Lake. The upper watershed is primarily agricultural and the lower reaches receive urban runoff and discharge from 19 CSO's of the Hillcrest and Brookside pump stations. Recent monitoring shows the concentration of total inorganic carbon, particulate organic carbon, copper, and lead were elevated. The Lake monitoring program does not sample storm events. The NYSDEC water quality classification for Harbor Brook from its mouth to Syracuse is designated as being Class"D"; from this point upstream to the City of Syracuse line the designation is Class "B"; from the City's line to the source of the Brook, the classification is "C".

2.2.8 Ninemile Creek, which enters Onondaga Lake from the south approximately 2.25 miles from the Lake's outlet along the west shore, has a watershed of about 125 square miles and includes Otisco Lake. The Creek receives ionic salts from wastebeds as well as treated wastewater from the villages of Camillus and Marcellus.

2.2.9 Tributary 5A enters Onondaga Lake about 0.8 miles northwest of the City of Syracuse line and the west shore of the Lake. This tributary receives treated wastewater from the Crucible Steel Plant. Tributary 5A has historically contributed iron, chromium, and copper to the Lake. Prior to 1974, these metals were not treated, however, the construction of an industrial wastewater reuse and treatment plant has resulted in significant reductions in loading.

2.2.10 The Bloody Brook watershed has an area of about 4.5 square miles, which extends to the northeast from about the mid-section of the east shore of Onondaga Lake. This Brook enters the Lake about 2.25 miles southeast of the Lake's outlet. The Tributary receives no significant pollution point sources with the exception of some treated coolant wastewaters from the General Electric Corporation's Park complex. From its mouth upstream to Tributary 8 (which is located about 0.4 mile from the mouth of the Brook),the NYSDEC water Quality classification is Class "B"; beyond Tributary 8 upstream to the Brook's source it is Class "D".

2.2.11 Sawmill Creek has a very small watershed and receives no significant pollutant point sources. From its mouth upstream to Euclid Road, the Creek has a NYSDEC water quality classification designation of Class "B"; from Euclid Road to the Creek's source it is Class"D".

2.2.12 The Onondaga Lake Outlet has not been monitored. The Barge Canal Terminal is actually the downstream reach of Onondaga Creek and the water quality for Onondaga Creek is characteristic of this lower end.

2.2.13 Sediment Quality: As indicated previously, the U.S. Army Corps of Engineers, Buffalo District has sampled and analyzed sediments from Syracuse Inner Harbor area and the proposed CDF disposal site (Figures EA-1, -2, and -3). This analysis is utilized to help

determine appropriate dredging and disposal procedures. Material dredged from Syracuse Inner Harbor area was analyzed and found to be suitable for CDF disposal only, and therefore will be disposed at UDS 5-19.

2.2.13.1 Sediment sampling locations for the Inner Harbor are shown in Figure EA-11. Sediment sampling locations at the proposed disposal area, UDS 5-19 (Trenches 1- 5) are shown in Figure EA-12.

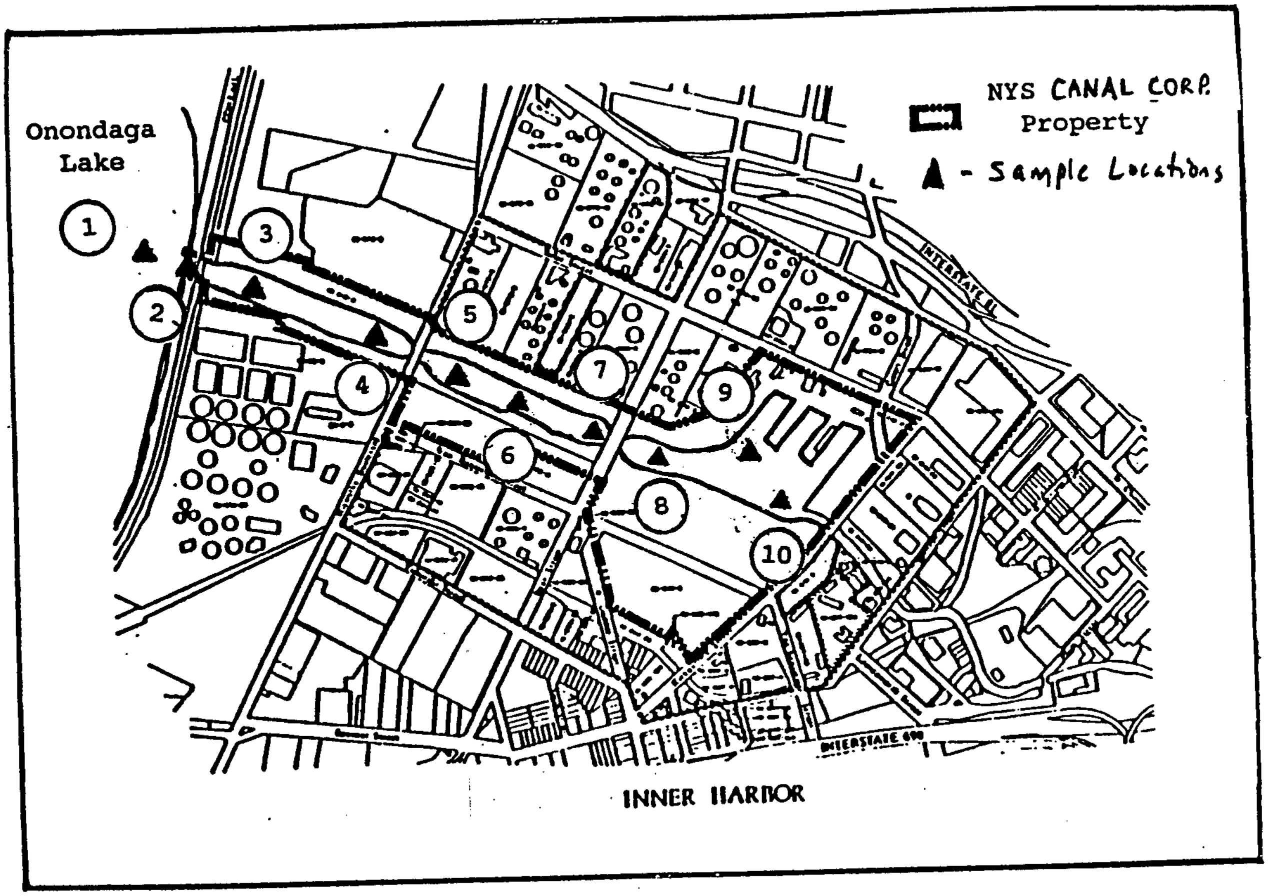
2.2.13.2 Particle size tests on proposed dredge material showed it to be a loose mixture of primarily silt and clay. Both bulk chemical total analyses and Toxic Characteristic Leaching Procedure (TCLP) analyses were conducted on candidate dredge material. Results of bulk chemical analyses are summarized in Table EA-6. TCLP analytical results are summarized in Table EA-7. The bulk chemical analyses show that the sediment proposed for dredging from the Inner Harbor has elevated levels of lead, cadmium, copper, ammonia-N, poly aromatic hydrocarbons (PAH's), and methyl ethyl ketone (MEK). There are low levels of PCB's and the chlorinated pesticides DDE, DDT, and DDD. Dieldrin was not detected. Elevated mercury levels from sampling locations 1 and 2 reflect the overall high mercury levels of Onondaga Lake from past chemical manufacturing. Very low levels of dioxins (2,3,7,8 TCDD) were measured.

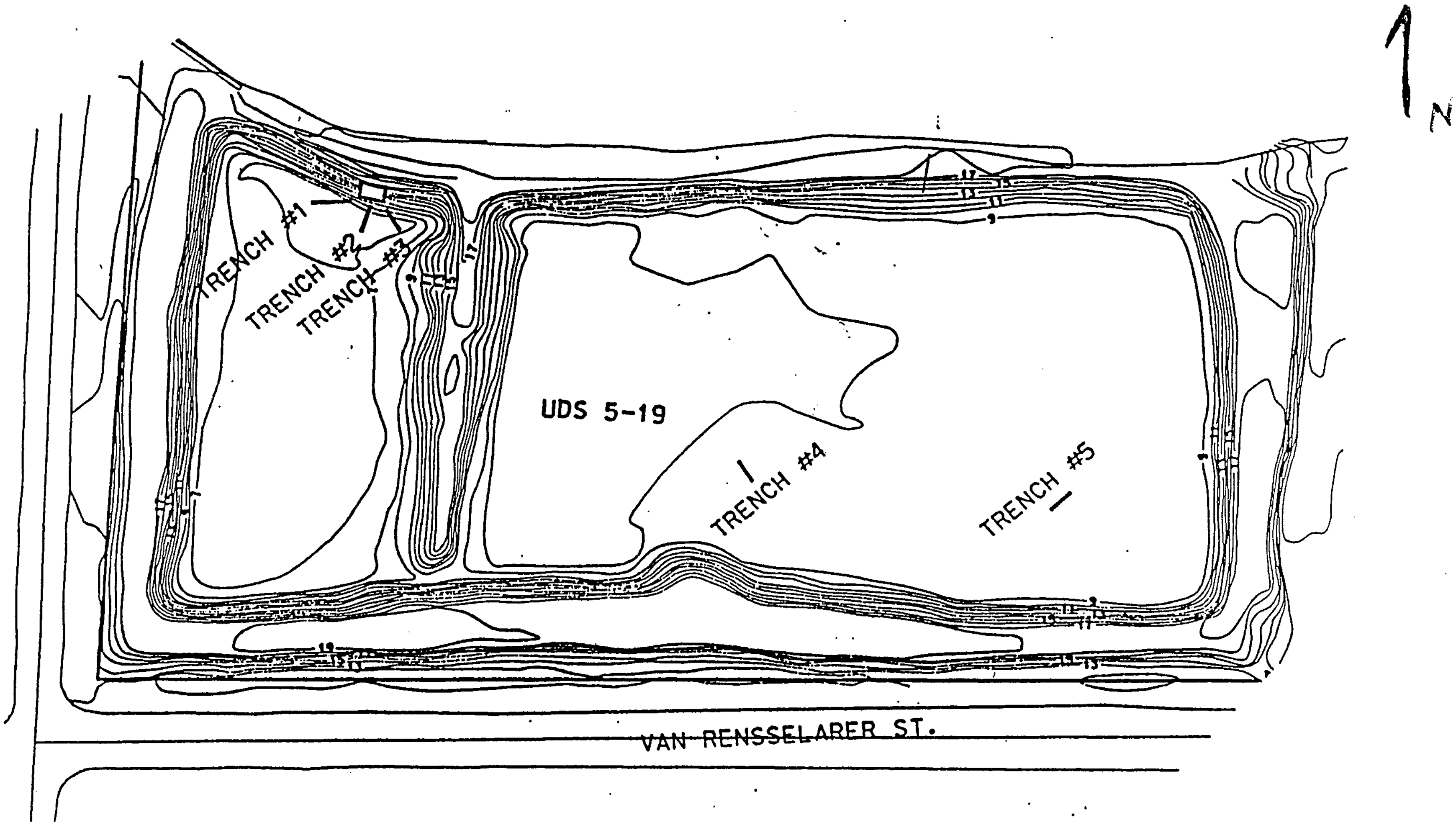
2.2.13.3 TCLP tests were conducted to ascertain if any of the sediments exhibited the Resource Conservation Recovery Act (RCRA) toxicity characteristic. Table EA-7 compares the range of values found in the sediment to regulatory levels under RCRA. The data shows very little leaching of toxic constituents under the stringent acid-leaching conditions of the TCLP leaching procedure and far below the regulatory standard. Disposal of sediments is therefore not subject to RCRA regulation. However, the elevated levels of metal and some organic contaminants as previously discussed makes it necessary to dispose of sediments in a secured confined disposal facility (CDF) or a licensed landfill.

2.2.13.4 Site UDS 5-19 (Figure EA-12) is proposed for disposal of sediments to be dredged from the Inner Harbor. Samples were taken at five locations as shown in Figure EA-12 for physical and chemical testing. Table EA-8 gives the particle size distribution of samples from site UDS 5-19. Trenches 1 and 2 were essentially mixtures of sand and silt while trenches 4 and 5 from lower lying areas were mixtures of silt and clay with no sand. Recompacted permeability of the silt and clay material was tested as only 18 cm/yr indicating that the dikes constructed of this material would be highly impermeable to passage of water or chemical constituents.

2.2.13.5 Tables EA-9 through EA-13 summarize chemical test data for the five test locations at UDS 5-19. As might be expected, the finer grained sediments from trenches 4 and 5 which are most representative of the overall site, contain somewhat higher levels of

Figure EA-11 - Sediment Sampling Locations in Onondaga Lake and Inner Harbor Area






**Scale : 1" = 100'**
**Trench Length Distorted**

Figure EA-12 - CDF

**UDS 5-19 Soil Sampling Locations**

## Table EA-6 - Onondaga Lake Inlet Bulk Chemical Analyses - Sediment Concentrations (mg/kg)

| | Sampling Sites | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **Hg** | 2.04 | 1.73 | 0.24 | 0.46 | 0.52 | 0.47 | 0.44 | 0.43 | 0.41 | 0.53 |
| **Cd** | 13 | 10.3 | 1.28 | 5.40 | 3.77 | 4.87 | 1.92 | 2.74 | 1.82 | 5.49 |
| **Pb** | 176 | 197 | 68.2 | 138 | 150 | 172 | 132 | 182 | 124 | 147 |
| **Cu** | 123 | 118 | 71.1 | 88.5 | 73.1 | 74.0 | 75.0 | 89.6 | 78.2 | 69.4 |
| **DDT,DDE,DDD** | <0.01 | <0.01 | 0.016 | 0.04 | <0.01 | 0.012 | 0.045 | 0.037 | 0.026 | 0.024 |
| **Dieldrin** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| | | | | | | | | | | |
| **PCB** | 1.25 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 |
| **2,3,7,8 TCDD (1)** | <1 | 1.4 | <1 | <1 | <1 | 1.1 | 1.7 | 1.2 | 1.2 | <1 |
| **PAH** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **Anthracene** | 17.0 | 4.6 | 20.0 | 9.4 | 1.5 | 8.0 | 21.0 | 7.0 | 0.86 | 26.0 |
| **Benzo(a)anthracene** | 16.0 | 14.0 | 12.0 | 9.4 | 9.0 | 6.4 | 29.0 | 6.4 | 5.4 | 30.0 |
| **Chrysene** | 12.0 | 11.0 | 9.4 | 6.8 | 10.2 | 6.7 | 26.0 | 6.8 | 6.2 | 30.0 |
| **BTX (2)** | 2.7 | 0.9 | 3.0 | 0.78 | 0.40 | 0.26 | 1.9 | 0.68 | 1.6 | 2.0 |
| **Benzene** | <0.9 | 0.39 | 0.41 | 0.41 | <0.9 | <0.9 | <0.95 | <0.95 | <0.8 | <1.0 |
| **MEK (3)** | 29 | 20 | 11 | 16 | 16 | 20 | 10 | 14 | 14 | 11 |
| **Trichloroethylene** | 1.8 | 1.7 | 1.4 | 0.46 | 1.8 | 1.8 | 1.9 | 1.9 | 1.6 | 2.0 |
| **Ammonia** | 580 | 101 | 194 | 226 | 266 | 198 | 387 | 316 | 398 | 191 |

(1) Concentrations in ppt
(2) Sum of Benzene & Toluene & Xylene
(3) Methyl Ethyl Ketone

Table EA-7 - Toxic Characteristic Leaching Procedure (TCLP) Comparison

| Constituent | Onondaga Inner Harbor Levels (mg/l) | Regulatory Level (mg/l) |
|---|---|---|
| Arsenic | <0.060 - 0.110 | 5.0 |
| Barium | 0.275 - 1.270 | 100.0 |
| Benzene | <0.044 | 0.5 |
| Cadmium | 0.003 - 0.015 | 1.0 |
| Carbon Tet | <0.087 | 0.5 |
| Chlordane | <0.006 - <0.03 | 0.03 |
| Chlorobenzene | <0.044 | 10.0 |
| Cloroform | <0.087 | 6.0 |
| Chromium | 0.005 - 0.011 | 5.0 |
| o-Cresol | <0.002 - <0.01 | 200.0 |
| m-Cresol | <0.002 - <0.01 | 200.0 |
| p-Cresol | <0.002 - <0.01 | 200.0 |
| Cresol | <0.002 - <0.01 | 200.0 |
| 2,4-D | <0.004 - <0.02 | 10.0 |
| 1,4-Dichlorobenzene | <0.002 | 7.5 |
| 2,2-Dichloroethane | <0.087 | 0.5 |
| 1,1-Dichloroethylene | <0.087 | 0.7 |
| 2,4-Dichlorotoluene | <0.002 - <0.01 | 0.13 |
| Endrin | <0.004 - <0.02 | 0.02 |
| Heptachlor | <0.0015 - <0.0075 | 0.008 |
| Hexachlorobenzene | <0.002 - <0.01 | 0.13 |
| Hexachloro-1,3-butadiene | <0.002 - <0.01 | 0.5 |
| Hexachloroethane | <0.002 - <0.01 | 3.0 |
| Lead | 0.066 - 0.033 | 5.0 |
| Lindane | <0.004 - <0.02 | 0.4 |
| Mercury | <0.0002 | 0.2 |
| Methoxychlor | <0.01 - <0.05 | 10.0 |
| Methyl ethyl ketone | <0.87 | 200.0 |
| Nitrobenzene | <0.004 - <0.02 | 2.0 |
| Pentachlorophenol | <0.004 - <0.02 | 100.0 |
| Pyridine | <0.01 - <0.05 | 5.0 |
| Selenium | <0.050 | 1.0 |
| Silver | <0.007 | 5.0 |
| Tetrachloroethylene | <0.087 | 0.7 |
| Toxaphene | <0.1 - <0.5 | 0.5 |
| Trichloroethylene | <0.087 | 0.5 |
| 2,4,5-Trichlorophenol | <0.002 - <0.01 | 400.0 |
| 2,4,6-Trichlorophenol | <0.002 - <0.01 | 2.0 |
| 2,4,5-TP (Silvex) | <0.004 - <0.02 | 1.0 |
| Vinyl Chloride | <0.174 | 0.2 |

Table EA-8 - Particle Size Distribution of Samples from UDS 5-19

| Sample | % Sand | % Silt | % Clay |
|---|---|---|---|
| UDS5-19, TRENCH 1 | 51.13 | 44.63 | 4.24 |
| UDS5-19, TRENCH 2 | 58.49 | 36.38 | 5.14 |
| UDS5-19, TRENCH 3* | -- | -- | -- |
| UDS5-19, TRENCH 4 | 0.00 | 80.41 | 19.59 |
| UDS5-19, TRENCH 5 | 0.00 | 65.67 | 34.33 |

* Sample lost due to breakage of graduated cylinder

Table EA-9 - UDS 5-19 Metals and Inorganic Parameters (Mg/Kg)

| ANALYTE | METHOD | UDS5-19 TRENCH 1 (mg/Kg) | UDS5-19 TRENCH 2 (mg/Kg) | UDS5-19 TRENCH 3 (mg/Kg) | UDS5-19 TRENCH 4 (mg/Kg) | UDS5-19 TRENCH 5 (mg/Kg) |
|---|---|---|---|---|---|---|
| Arsenic | Furnace by 7060 | 1.10 | 0.99 (S) | 0.81 | 12 (S) | 11 (S) |
| Mercury | Cold Vapor by 7471 | 0.36 (U) | 0.32 (U) | 0.34 (U) | 0.91 | 0.77 |
| Aluminum | ICP by 6010 | 2000 | 2100 | 3100 | 11000 | 10000 |
| Antimony | ICP by 6010 | 29 (U) | 13 (U) | 27 (U) | 3 (U) | 3.1 (U) |
| Barium | ICP by 6010 | 110 | 43 | 130 | 190 | 180 |
| Beryllium | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 0.42 | 0.41 |
| Cadmium | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 8 | 8 |
| Calcium | ICP by 6010 | 210000 | 120000 | 190000 | 65000 | 61000 |
| Chromium | ICP by 6010 | 7.2 (U) | 4 | 6.8 (U) | 71 | 73 |
| Cobalt | ICP by 6010 | 7.2 (U) | 3.2 (U) | 6.8 (U) | 9.2 | 8.8 |
| Copper | ICP by 6010 | 18 (U) | 8 (U) | 17 (U) | 98 | 94 |
| Iron | ICP by 6010 | 4700 | 4900 | 5500 | 21000 | 20000 |
| Lead | ICP by 6010 | 21 (U) | 9.6 (U) | 20 (U) | 250 | 230 |
| Magnesium | ICP by 6010 | 6100 | 9400 | 6500 | 18000 | 17000 |
| Manganese | ICP by 6010 | 420 | 240 | 400 | 470 | 440 |
| Nickel | ICP by 6010 | 14 (U) | 6.4 (U) | 14 (U) | 46 | 43 |
| Potassium | ICP by 6010 | 1400 (U) | 640 (U) | 1400 (U) | 1100 | 1000 |
| Silver | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 5.2 | 4.7 |
| Sodium | ICP by 6010 | 360 | 180 | 430 | 32 | 290 |
| Vanadium | ICP by 6010 | 3.6 (U) | 4 | 4.7 | 23 | 21 |
| Zinc | ICP by 6010 | 16 | 15 | 28 | 260 | 250 |
| Selenium | Furnace by 7740 | 3.6 (U) | 0.32 (U) | 3.4 (U) | 0.38 (U) | 0.38 (U) |
| Thallium | Furnace 7841 | 0.36 (U) | 0.32 (U) | 0.34 (U) | 0.5 | 0.38 (U) |
| Ammonia Nitrogen, (mg/Kg) | 350.3 | 400 | 320 (U) | 380 | 1100 | 430 |
| COD, (mg/Kg) | 8000M | 4600 | 2800 | 5500 | 6300 | 7400 |
| Cyanide, (mg/Kg) | 9012M | 0.72 (U) | 0.64 (U) | 0.68 (U) | 1.2 | 1.2 |
| Soilds, Total Volatile (TVS) (%) | 209F | 0.80 | 0.60 | 0.79 | 5.5 | 5.4 |
| Sulfate, (mg/Kg) | 375.4 | 1100 | 640 (U) | 680 (U) | 870 | 1400 |
| Sulfur, (%) | ASTM D129 | 0.11 | 0.094 (U) | 0.097 (U) | 0.12(U) | 0.12 (U) |
| TOC, (mg/Kg) | 9060 | 46000 | 18000 | 33000 | 47000 | 44000 |

Table EA-10 - UDS 5-19 Volatile Organics (Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 2 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| Dichlorodifluoromethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Chloromethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Bromomethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Vinyl Chloride | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Chloroethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Trichlorofluoromethane | 7 (U) | 6 (U) | 14 (U) | 38 (U) | 15 (U) |
| Methylene Chloride | 10 (B) | 16 (B) | 7 (B) | 35 (JB) | 25 (B) |
| 1, 1-Dichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1-Dichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 2,2-Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| trans-1,2-Dichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| cis-1,2-Dichlorethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Chloroform | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1-Dichloropropene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Dibromomethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromochloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1, 1-Trichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Carbon Tetrachloride | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dibromoethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromodichloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 2-Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,3 -Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Trichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Dibromochloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1, 2-Trichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Benzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromoform | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Tetrachloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1,2,2-Tetrachloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1,1,2-Tetrachloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Toluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Chlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Ethylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Styrene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| meta+para-xylenes | 7 (U) | 6 (U) | 7 (U) | 12(J) | 15 (U) |
| ortho-xylene | 7 (U) | 6 (U) | 7 (U) | 44 | 5 (J) |
| Isopropylbenzene | 7 (U) | 6 (U) | 7 (U) | 29 (J) | 15 (U) |
| Bromobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,3-Trichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| n-Propylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 2-Chlorotoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 4-Chlorotoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,3,5-Trimethylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| tert-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,4-Trimethylbenzene | 7 (U) | 6 (U) | 7 (U) | 190 | 26 |
| sec-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 10 (J) | 5 (J) |
| 1,3-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,4-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| p-Isopropyltoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| n-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dibromo-3-chloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,4-Trichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Naphthalene | 7 (U) | 6 (U) | 7 (U) | 23 (J) | 15 (U) |
| Hexachlorobutadiene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,3-Trichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |

U = Undetected
D = Dilution performed
J = Below method detection limit
B = Compound also detected in method blank
RE = Reanalysis performed (see non-conformance summaries)

Table EA-11 - UDS 5-19 Semi-Volatile Organics (Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 2 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| bis(2-Chloroethyl)ether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Phenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Chlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 3-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 4-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 2-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 2'-oxybis(1-Chloropropane) | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachloroethane | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| N-Nitroso-di-n-propylamine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 3&4-Methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Nitrobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Isophorone | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Nitrophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4-Dimethylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| bis(2-Chloroethoxy)methane | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4-Dichlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 2, 4-Trichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Naphthalene | 480 (U) | 430 (U) | 450 (U) | 360 (JD) | 610 (JD) |
| 4-Chloroaniline | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachlorobutadiene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Chloro-3-methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Methylnaphthalene | 480 (U) | 430 (U) | 450 (U) | 650 (JD) | 6300 (D) |
| Hexachlorocyclopentadiene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4, 6-Trichlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4, 5-Trichlorophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 2-Chloronaphthalene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Acenaphthylene | 480 (U) | 430 (U) | 450 (U) | 740 (JD) | 1000 (JD) |
| Dimethylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 6-Dinitrotoluene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Acenaphthene | 480 (U) | 430 (U) | 450 (U) | 3600 (D) | 3900 (D) |
| 3-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 2, 4-Dinitrophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Dibenzofuran | 480 (U) | 430 (U) | 450 (U) | 650 (JD) | 770 (JD) |
| 2, 4-Dinitrotoluene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Nitrophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Fluorene | 480 (U) | 430 (U) | 450 (U) | 2500 (D) | 2700 (D) |
| 4-Chlorophenyl-phenylether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Diethylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 4, 6-Dinitro-2-methylphenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| n-Nitrosodiphenylamine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Bromophenyl-phenylether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Pentachlorophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Phenanthrene | 480 (U) | 430 (U) | 49 (J) | 6400 (D) | 6000 (D) |
| Anthracene | 480 (U) | 430 (U) | 450 (U) | 2800 (D) | 3400 (D) |
| Carbazol | 480 (U) | 430 (U) | 450 (U) | 480 (JD) | 890 (JD) |
| Di-n-butylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Fluoroanthene | 96 (J) | 430 (U) | 61 (J) | 7000 (D) | 13000 (D) |
| Pyrene | 81 (J) | 430 (U) | 69 (J) | 7700 (D) | 12000 (D) |
| Butylbenzylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 3, 3'-dichlorobenzidine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(a)anthracene | 60 (J) | 430 (U) | 65 (J) | 3200 (D) | 6400 (D) |
| Chrysene | 48 (J) | 430 (U) | 58 (J) | 3800 (D) | 6600 (D) |
| bis(2-Ethylhexyl)phthalate | 480 (U) | 430 (U) | 450 (U) | 2600 (D) | 6200 (D) |
| Di-n-octylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(b)fluoranthene | 480 (U) | 430 (U) | 450 (U) | 2500 (D) | 6500 (D) |
| Benzo(k)fluoranthene | 480 (U) | 430 (U) | 50 (J) | 2300 (D) | 3500 (D) |
| Benzo(a)pyrene | 480 (U) | 430 (U) | 54 (J) | 2500 (D) | 4600 (D) |
| Indeno(1, 2,3-cd)pyrene | 480 (U) | 430 (U) | 450 (U) | 1900 (D) | 3300 (D) |
| Dibenz(a, h)anthracene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(g, h, i)perylene | 480 (U) | 430 (U) | 450 (U) | 1700 (D) | 3000 (D) |

U = Undetected
D = Dilution performed
J = Below method detection limit
B = Compund also detected in method blank
RE = Reanalysis performed (see non-conformance summaries)

Table EA-12 - UDS 5-19 Pesticides and PCB's (Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 2 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| **Pesticides** | | | | | |
| Lindane | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| Heptachlor | 1.4 (U) | 1.3 (U) | 1.4 (U) | 1.5 (U) | 1.5 (U) |
| Aldrin | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| Heptachlor epoxide | 4.8 (U) | 4.3 (U) | 4.5 (U) | 5.1 (U) | 5.1 (U) |
| Endosulfan I | 2.4 (U) | 2.1 (U) | 2.3 (U) | 34 | 2.6 (U) |
| Dieldrin | 1 (U) | 0.9 (U) | 0.9 (U) | 1 (U) | 1 (U) |
| Endosulfan II | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| 4,4'-DDT | 0.5 (U) | 0.4 (U) | 0.5 (U) | 0.5 (U) | 0.5 (U) |
| Endrin aldehyde | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| Methoxychlor | 200 | 17 (U) | 180 | 20 (U) | 21 (U) |
| alpha-BHC | 1.2 (U) | 1.1 (U) | 1.1 (U) | 1.3 (U) | 1.3 (U) |
| beta-BHC | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| delta-BHC | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| 4,4'-DDE | 2.4 (U) | 2.1 (U) | 2.3 (U) | 23 | 2.6 (U) |
| Endrin | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| 4,4'-DDD | 2.4 (U) | 2.1 (U) | 2.3 (U) | 72 | 2.6 (U) |
| Endosulfan sulfate | 4.8 (U) | 4.3 (U) | 4.5 (U) | 5.1 (U) | 5.1 (U) |
| Endrin ketone | 81 | 2.1 (U) | 77 | 2.5 (U) | 2.6 (U) |
| Chlordane | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| Toxaphene | 12 (U) | 11 (U) | 11 | 13 (U) | 13 (U) |
| **Polychlorinated Biphenyls** | | | | | |
| Aroclor 1016 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1221 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1232 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1242 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1248 | 4900 | 21 (U) | 1400 | 530 | 515 |
| Aroclor 1254 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1260 | 24 (U) | 21 (U) | 23 (U) | 520 | 26 (U) |

U = Undetected
D = Dilution performed
J = Below method detection limit
RE = Reanalysis performed (see non-conformance summaries)

Table EA-13 - UDS 5-19 Furans and Dioxins (pg/g)

| Analyte | UDS5-19 Trench 1&2 pg/g |
|---|---|
| **Furans** | |
| TCDFs (total) | ND |
| 2, 3, 7, 8-TCDF | ND |
| PeCDFs (total) | ND |
| 1, 2, 3, 7, 8-PeCDF | ND |
| 2, 3, 4, 7, 8-PeCDF | ND |
| HxCDFs (total) | ND |
| 1, 2, 3, 4, 7, 8-HxCDF | ND |
| 1, 2, 3, 6, 7, 8-HxCDF | ND |
| 2, 3, 4, 6, 7, 8-HxCDF | ND |
| 1, 2, 3, 7, 8, 9-HxCDF | ND |
| HpCDFs (total) | ND |
| 1, 2, 3, 4, 6, 7, 8-HpCDF | ND |
| 1, 2, 3, 4, 7, 8, 9-HpCDF | ND |
| OCDF | ND |
| **Dioxins** | |
| TCDDs (total) | ND |
| 2, 3, 7, 8-TCDD | ND |
| PeCDDs (total) | ND |
| 1, 2, 3, 7, 8-PeCDD | ND |
| HxCDDs (total) | ND |
| 1, 2, 3, 4, 7, 8-HxCDD | ND |
| 1, 2, 3, 6, 7, 8-HxCDD | ND |
| 1, 2, 3, 7, 8, 9-HxCDD | ND |
| HpCDDs (total) | ND |
| 1, 2, 3, 4, 6, 7, 8-HpCDD | ND |
| OCDD | 20 |

ND = Not Detected

inorganic and organic contaminants. This includes elevated levels of the metals cadmium, chromium, copper, lead, zinc, xylene, tri-methyl benzene, phthalates, and an array of PAH's. Low levels of PCB's (~0.5 to 5 mg/kg) were found at trenches 1, 2, 4, and 5. The chlorinated pesticides endosulfan, methoxychlor, DDE, DDD, toxaphene, and endrin ketone were found at various trench locations.

2.2.13.6 The data shows that the dredge material proposed for disposal at UDS 5-19 has similar characters as the dredge material already disposed of at this site. The levels of contaminants in the material proposed for disposal at UDS 5-19 is about the same as levels at the site. It is concluded that the material proposed for disposal at UDS 5-19 is compatible both physically and chemically with dredge material already in place.

2.2.14 Plankton: Microscopic algae, referred to as phytoplankton, annually cause dense algal blooms in Onondaga Lake that affect the Lake's water clarity as well as its oxygen resources (Onondaga County, 1990). A brief synopsis of the species of phytoplankton as well as zooplankton found in Onondaga Lake is provided from the available literature as follows:

2.2.14.1 A publication entitled "Algae, Man and the Environment" (Jackson, 1968) points out, since about 1962, blooms of algae have been known to occur annually in Onondaga Lake - usually in late June or early July - and that such blooms are composed of members of two Divisions, the Chlorophyta and Euglenophyta. Further, "diatoms are abundant throughout the year" and the algae genera Chlamydomonas and Cyclotella both normally occur in abundance in Onondaga lake (Jackson 1968).

2.2.14.2 Onondaga County conducted phytoplankton studies between April 1968 and December 1969, during which time about 100 species of algae were identified. At the time of the study, "the dominant phytoplankters show the expected succession for a shallow, nutrient rich lake: diatoms and flagellates in the spring, green algae of the Chlorococcales in the early summer, blue-green algae in the middle of summer, and a association of diatoms in the fall" (Onondaga County, 1971).

2.2.14.3 The results of a 1975-77 monitoring study of the Lake were described in a paper entitled "Seasonal Succession of Phytoplankton in Onondaga Lake, New York, USA" (Sze, 1980). The pattern of phytoplankton succession in the Lake during the sampling period (1975-77) was found to be very similar to the period of 1973-74 which was after phosphorus loading was reduced in the Lake (Sze, 1975). The banning of detergents with phosphorus in them by New York State took place in 1972. There was an estimated 80 percent decrease in dissolved phosphorus loading in Onondaga Lake after 1972 (Murphy, 1973). Prior to 1972, chlorococcalean green algae such as Chlorella and Scenedesmus were replaced by blue-green algae - mainly Microcystis and Aphanizomenon - as the dominant mid-summer algal group. Following 1972, throughout the summer period, green algae were dominant, whereas the blue-green algae were almost completely absent (Sze, 1975). During the 1975-77 monitoring

study, diatoms and flagellates were commonly found during throughout the spring season, followed by replacement with chlorococcalean green algae as being abundant. Around late September, abundance of algae decreased, but many of the summer algal species still persisted at lower concentrations (Sze, 1980).

2.2.14.4 A more recent study of plankton in Onondaga Lake took place during teethe period of May 27 to October 27, 1987. This study gathered information regarding the abundance of major phytoplankton and zooplankton groups present in Onondaga lake. The plankton study report "Zooplankton Impacts on Chlorophyll and Transparency in Onondaga Lake, New York, USA" (Auer, M.T., et al, 1988) notes that, during the spring season, the dominant phytoplankton found were cryptomonads (Cryptomonas erosa and Chroomonas sp.), as well as flagellated green algae (Chlamydomonas sp.). Some species of diatoms were also present (i.e., Cyclotella meneghiniana and Synedra delicatissima). In the spring, zooplankton found in the sampling were Cyclops copepodites and adult Cyclops vernalis and Cyclopis biscuspidatus. Following a clearing event that took place on July 13, it was found that the abundance of herbivorous zooplankton dropped - which may have been due to an decrease in abundance of food. After the clearing event, phytoplankton numbers increased, whereby chlorococcalean green algae such as Oocystis parva, Pediastrum duplex, and Coelastrum micrporum were dominant. There was a decrease in calanoid copepods and cladocerans around late August and early September, however, the population of cryptomonads and flagellate green algae increased. Over the remaining 3 months of the study, the Lake's clearing event seemed to trigger notable shifts in the plankton composition for both the phytoplankton and zooplankton populations in the Lake (Auer, M.T., et al, 1988).

2.2.14.5 A report on the Onondaga Lake Monitoring program (Onondaga County, 1990) addresses results of a 1988 survey of both phytoplankton and zooplankton in the Lake. During the sampling period between March 30 and November 11 - whereby samples were collected at north and south areas of the Lake, a variety of phytoplankton including flagellated green algae, non-flagellated green algae, diatoms, euglenoids, dinoflagellates, cryptomonads, and cyanobacteria were identified. Phytoflagellates dominated the lake during the May-June period. During the July-October time frame, chlorococcalean green algae were dominant. The predominant species of phytoplankton noted during the summer sampling was Oocystis parva. The report indicated that "diatoms continued to be relatively unimportant group." With regard to zooplankton, rotifers, copepods, and cladocerans were found inhabiting the Lake. The lake monitoring report indicated that the "rotifers Keratella and Brachionus were common during late April and early may; also that, cladocerans were abundant from May into November." The abundance of zooplankton was determined to be comparable to previous years.

2.2.14.6 The most recent report prepared as part of the on-going Onondaga Lake Management Conference Biological Monitoring Program is entitled "Phytoplankton, Zooplankton, Macrobenthos, and Ichthyoplankton Abundance, Biomass, and Species Composition in Onondaga lake, 1994." by Makarewicz, Dr. Joseph, et al, 1994." Based on phytoplankton biomass and the occurrence of indicator species, Onondaga Lake's

pelagic waters would be classified as eutrophic. Abundance of phytoplankton, especially Cryptophyta, are greater than any previous year since 1987 with the exception of Cyanobacteria. A "clear phase" in the lake was apparent in June, when phytoplankton abundance decreased from a high of over 250,000 cells/mL to less than 25 cells/mL in two weeks. Small, unicellular algae dominated prior to the clear phase while colonial and filamentous algae were dominant after the clear phase. An intense bloom of Cryptophyta (mostly Rhodomonas minuta and Cryptomonas erosa), which has not been observed previously, occurred in the spring. Abundance of Cyanobacteria is similar to previous studied. However, the duration of Cyanobacteria bloom has progressively increased from 1987: one month (August) in 1987, two month (August and September) in 1989, three months (July, August, and September) in 1990, four to five months (April, June, July, August, and September) in 1994. The number of species has apparently increased with several new phytoplankton species having abundances in excess of 1000 cells/mL. The Euglenophyta are clearly not present in the lake and several filamentous or colonial species have become ubiquitous including: Oscillatoria limnetica, Synechococcus elongatus, Gomphosphaeria lacustris, Anabaeba flos-aquae, and Sphaerocystis schroeteri.

2.2.14.7 In 1994, 32 species representing 18 genera from the Calanoida, Cladocera, Cyclopoida, and Rotifera comprised the offshore zooplankton community of Onondaga Lake. Seasonally, multiple biomass peaks occurred: mid-July and mid-August. Both were caused by Cladocera: Daphnia galeata mendotae and D. pulex in mid-July and a second peak of D. galeata mendotae in mid-August. Dominant species in 1994 included; Daphnia galeata mendotae (Cladocera), Cyclops bicuspidatus thomasi (Cyclopoida), Diaptomus siciloides (Calanoida), and Keratella cochearis (Rotifera). The changing nature of the zooplankton community of Onondaga Lake was evident by differences between 1994 data and of that of earlier surveys. Although Diaptomus siciloides continues to be the dominant calanoid in 1994, the 1994 sampling revealed a cladoceran and copepod community that has changed from the 1987-89 period. During the 1987-1989 period, only Cyclops vernalis was considered common, while by 1994, abundance of C. bicuspidatus thomasi, C. vernalis, and Mesocyclops edax were high enough to be considered to be common species. Another interesting change is in the Cladocera populations. As in the 1987-89 period, Diaphanosoma leuchtenbergianum, Daphnia pulex, Daphnia galeata mendotae were common. However, two new species of Daphnia are present and common, D. catawba and D. ambigua. Similar to the 1986-89 period, Daphnia biomass represented 53.3 percent of the zooplankton biomass during the 1994 study period.

2.2.15 Benthos: Available studies on benthic invertebrates in Onondaga Lake and its tributaries are limited. Recently, in 1989, some preliminary study of benthic invertebrates in the lake was started (Wagner, Ringler, and Effler, unpublished), however, quantitative data on primary as well as secondary producers are lacking (Ringler, N. and K. Wagner, 1994.) Noble and Forney (1971) reported some work done on benthic fauna in Onondaga Lake, whereas Cooper, et al (1974) collected and identified benthic organisms in some areas of Ninemile Creek during a water quality study (Table EA-14). Also, New York State Department of Environmental Conservation (NYSDEC) conducted a biological survey in

1989, during which macroinvertebrate populations were documented in a number of tributary creeks (Table EA-15).

2.2.15.1 As part of the "Fish Survey of Onondaga Lake" - Summer of 1969 (Noble and Forney, 1971) conducted sampling for benthic invertebrates at four fishery sampling stations in the lake, numbers 3, 5, 6, and 8 (Figure EA-13). At the time of the survey, no benthic organisms were found at stations 3 and 6. At station number 8, located along the western shore of the lake, near the mouth of Ninemile Creek, it was reported that a large number of benthic organisms were taken. Those organisms sampled included; chironomid larvae and Ostracod (seed shrimp) at a depth of 10 feet and 6 feet, respectively.

2.2.15.2 A "Macroinvertebrate Study of Ninemile Creek" was conducted during the week of August 21-24 and again on August 27, 1973 by NYSDEC (Cooper, et al, 1974). Nine stations in riffle zones of the creek were sampled with a Surber sampler between Otisco lake, downstream to a point below the waste entry of the Allied Chemical Solvay Plant (Table EA-15). A diversity of benthic fauna were collected. The major groups of benthic macroinvertebrate taxa found during the survey were Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (Caddisflies), Diptera (true-flies), Neuroptera (alderflies, fishflies, and hellgrammites), Coleoptera (beetles), Mollusca (snails), Isopoda (sow Bugs), Amphipoda (freshwater scuds), Oligochaeta (worms), Platyhelminthes (flatworms), Acari (watermites), and Gordian Worms (roundworms). In general, mayflies, caddisflies, beetles, and worms were found at 8 of the 9 creek sample stations, whereas the true-flies were found at all 9 sample locations.

2.2.15.3 A biological survey that sampled resident macroinvertebrates in tributary streams (creeks and brooks) to Onondaga Lake was conducted on June 2 and June 27, 1989 by the NYSDEC Stream Biomonitoring Unit. The waterways sampled included Sawmill Creek, Bloody Brook, Ley Creek, Onondaga Creek, Harbor Brook, and Ninemile Creek. In general, the survey found that near the mouth of almost all of the streams sampled, the benthic communities were dominated by worms, midges, and sow bugs. All the tributaries surveyed contained pollution tolerant macroinvertebrate fauna. Some sampling stations on several of the streams contained invertebrate larval stages indicative of improved water conditions (i.e., caddisflies, stoneflies, and mayflies). Table EA-15 identifies the stations sampled on the tributary streams, as well as the dominant benthic invertebrate fauna collected at these stations during the 1989 survey.

2.2.15.4 During the 1989 survey, samples were also collected at a four lake sites (Figure EA-13). Chironomids dominated the community, especially at the two sites along the west shore near the Allied Waste Beds. Oligochaetes amphipods made up the remainder of the benthic macroinvertebrate community and were more common on the east shore near the park and marina. At the Waste bed sites in 1994 (Figure EA-14), a seasonal succession in relative abundance occurred. The community composition in 1994 represents a very different macroinvertebrate community from what was observed in 1989 offshore near the

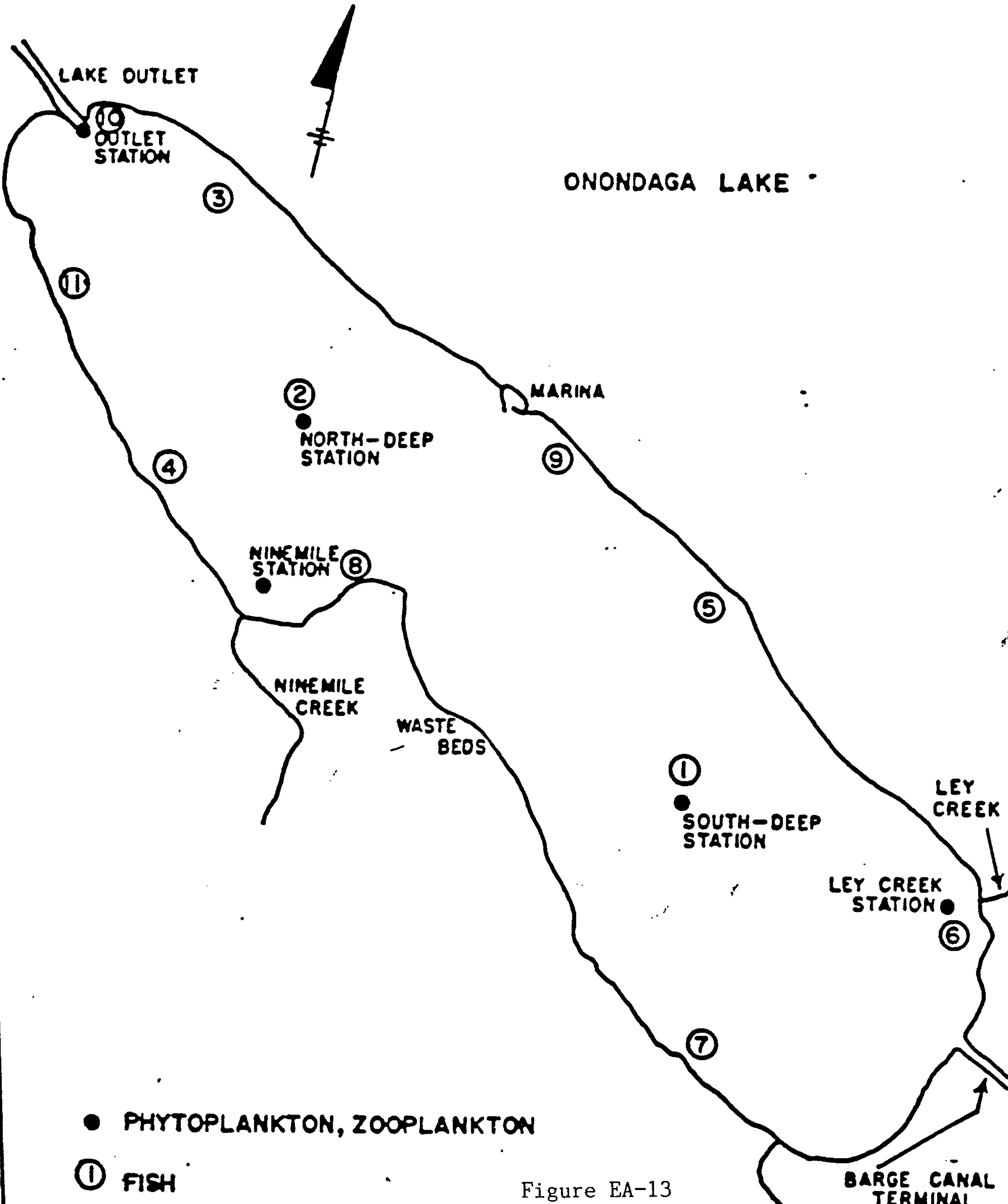



Figure EA-13

SOURCE: (Noble and Forney, 1971)
also
(Onondaga County, 1971)

**BIOLOGICAL SAMPLING LOCATIONS**

O'BRIEN & GERE

C-1

Table EA-14 - LOCATION OF NINEMILE CREEK BIOLOGICAL SAMPLING STATIONS *

| Station | |
|---|---|
| 1. | Ninemile Creek on first riffle about 60 feet above Schuyler Road bridge (1st bridge south of U.S. Route 20) near U.S. Geological Gauging Station; mileage point about 20.1 and about Latitude 42° 55' 15" N, Longitude 76° 19' 48" W. |
| 2. | Ninemile Creek on first riffle about 75 feet below bridge on Lawrence Road, the second bridge below U.S. & NY Route 20; mileage point about 15.8 and about Latitude 40° 57' 27" N, Longitude 76° 20' 28" W. |
| 3. | Ninemile Creek at lower end of riffle about 70 feet below bridge on North Street (NY Route 174) just below Marcellus, NY; mileage point about 12.85 and about Latitude 40° 59' 29" N, Longitude 76° 20' 25" W. |
| 4. | Ninemile Creek about 400 feet below first bridge below old Sagamore Paper Plant by small picnic area; mileage point about 11.6 and about Latitude 40° 0' 20" N, Longitude 76° 20' 13" W. |
| 5. | Ninemile Creek on lower section of second riffle about 700 feet above bridge on NY Route 5 in Camillus, just below first tributary from east (dry not shown on map); mileage point about 7.83 and about Latitude 43° 2' 20" N, Longitude 76° 18' 31" W. |
| 6. | Ninemile Creek on second riffle about 800 feet below old Erie Canal crossing; mileage point about 4.75 and Latitude 43° 3' 32" N, Longitude 76° 17' 10" W. |
| 7. | Ninemile Creek on riffle about 500 feet below bridge over NY Route 173 at Amboy (just below Robert B. Spence Co.); mileage point about 3.85, Latitude 43° 4' 11" N, Longitude 76° 16' 25" W. |
| 8. | Ninemile Creek about 60 feet below dirt road bridge and about 1 mile below Amboy; mileage point about 2.95; Latitude 40° 4' 39" N, Longitude 76° 15' 50" W. |
| 9. | Ninemile Creek about 40 feet above bridge on NY Route 48 below Allied Chemical Co.; mileage point about 0.7; Latitude 40° 14' 50" N, Longitude 76° 13' 36" W. |

* SOURCE: (Copper, et al, 1974)

Table EA-15 LOCATIONS, SUBSTRATE AND DOMINANT BENTHIC ORGANISMS AT ONONDAGA LAKE TRIBUTARY SITES SAMPLED DURING THE 1989 NYSDEC SURVEY *

| Creek | Station Location | Substrate | Invertebrates |
|---|---|---|---|
| Sawmill Creek | Riffle zone. Upstream of Route 370 bridge adjacent to NYS Thruway | Gravel/Rubble | Riffle Beetle (<u>Stenelmis crenata</u>)<br>Sowbug (<u>Asselus racovitzai</u>)<br>Caddisfly (<u>Hydropsyche betteni</u>) |
| Bloody Brook | Riffle zone. Adjacent to the Lake-shore Drive-In off Route 370 | Rubble | Blackfly (<u>Simulium vittalum</u>)<br>Midge (<u>Cricotopus tremulus</u>)<br>Midge (<u>Conchopelopia</u> sp.) |
| Ley Creek | Station #1 Swift current Above Lemoyne Bridge at Route 298 | Gravel/Rubble | Sowbug (A. <u>racovitzai</u>)<br>Midge (<u>Conchopelopia</u> sp.)<br>Midge (C. <u>tremulus</u>) |
| | Station #2 Slower current, much less riffle area. Near the USGS gaging station, approx. 0.6 kilometers upstream of the mouth. | ------ | Worm (<u>Limnodrilus hoffmeister</u>)<br>Midge (<u>Conchapelopia</u> sp.)<br>Midge (C. <u>tremulus</u>) |
| Onondaga Creek | Station #1 Upstream site in Cardiff | ------ | Worm (L. <u>hoffmeisteri</u>)<br>Mayfly (<u>Baetis brunneicolor</u>)<br>Midge (<u>Tvetenia vitracies</u>) |
| | Station #2 Above Spenser St. in Syracuse, NY | Rock/Rubble/ Gravel/Sand | Worm (<u>Nais elinquis</u>)<br>Worm (<u>Enchytraeidae</u>)<br>Sowbug (A. <u>racovitzai</u>) |
| Harbor Brook | Station #1 Riffle Zone Off Route 173 near town of Split Rock | Rubble/Gravel | Midge (<u>Cricotopus bicinctus</u>)<br>Midge (<u>Micropsectra polita</u>)<br>Midge (<u>Eukiefferiella claripennis</u>) |
| | Station #2 Near USGS gaging station about 0.8 kilometers upstream of the mouth | Some Rubble and Gravel | Worm (<u>Nais elinquis</u>)<br>Worm (<u>Enchytraeidae</u>)<br>Worm (<u>Nais variabilis</u>) |
| Geddes Brook (Tributary to Ninemile Creek) | Strong current. Upstream of the Horan Road bridge | ------ | Worm (N. <u>elinquis</u>)<br>Sowbug (A. <u>racovitzai</u>)<br>Worm (<u>Enchytraeidae</u>) |
| Ninemile Creek | Station #1 Swift Current. Upstream of Amboy, below Warners Road bridge | Rocks/Rubble/ Gravel | Scud (<u>Grammarus</u> sp.<br>Worm (<u>N. elinquis</u>)<br>Worm (L. <u>hoffmeisteri</u>) |
| | Station #2 Upstream of State Fair Boulevard | Clay with rubble and gravel pockets | Scud (<u>Grammarus</u> sp.<br>Worm (<u>N. elinquis</u>)<br>Worm (L. <u>hoffmeisteri</u>) |

* SOURCE: (Bode, et al, 1989)

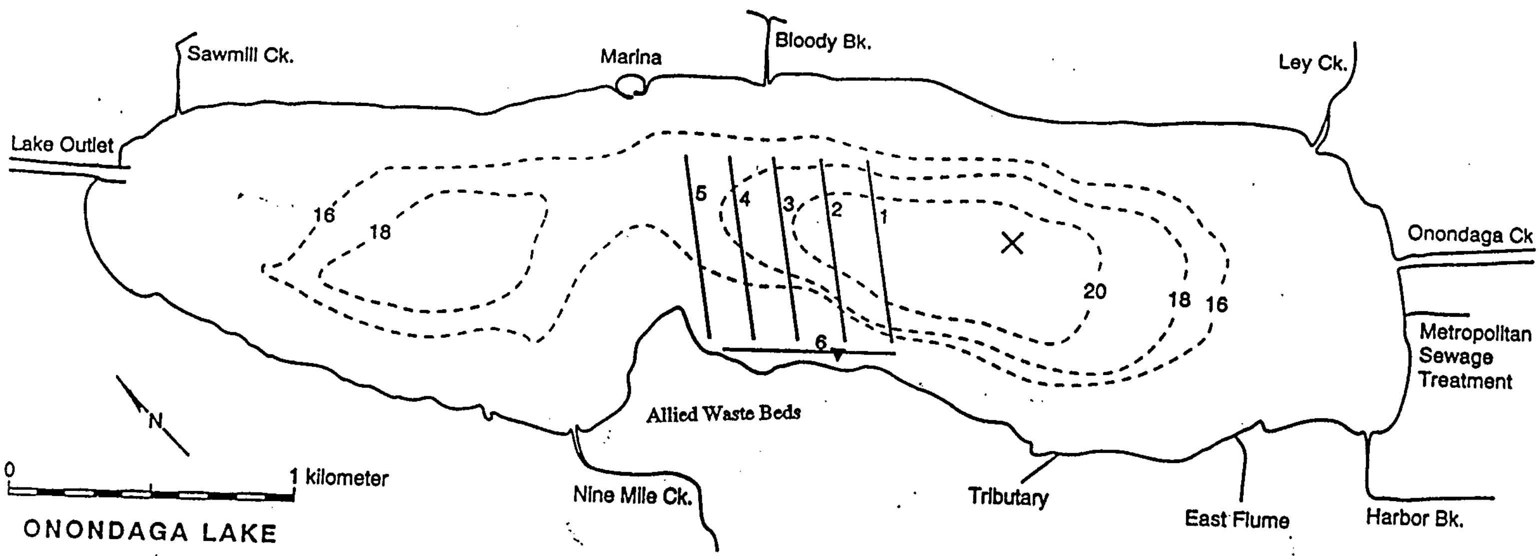



Figure EA-14 Map of Onondaga Lake showing sampling sites and icthyoplankton transects (1 through 6). X denotes the Main Lake Station. ▼ denotes the epilimnetic macrobenthos site.

waste beds. In particular, the relative abundance of the chironomids near the waste beds has decreased from 94 percent in 1989 to 34 percent in 1994, while the relative abundance of the oligochaetes and gammarids have increased (Figure EA-15). This may be suggesting that there has been an improvement in the benthic invertebrate habitat at this location (Makarewicz, et al, 1994).

2.2.16 Fisheries: In the past, Onondaga Lake supported a diverse coldwater fishery that include the Atlantic salmon (Salmo salar) which inhabited the Lake in the 1700's and early 1800's. This fish species became extinct in the lake by the late 1800's. During the 1800's, the lake still had plentiful oxygen levels as indicated by a healthy population of whitefish (Corregonus clupeaformis) (Effler, et al, 1986). However, this species was no longer found in the lake by 1898, presumably due to habitat and water quality degradation (Effler, 1987). Fish currently found in Onondaga Lake are primarily warmwater species. The upper water level (epilimnion) of the lake down to approximately 20 feet of depth generally contains sufficient oxygen levels which permit warmwater fish species survival. Water at lower levels (hypolimnion) may be cold enough for coldwater fish species, but are virtually devoid of oxygen (Onondaga Lake Advisory Committee pamphlet); Therefore, the hypolimnion does not presently support fish life. Other factors influencing the lakes's fishery are turbidity (contributing to reduced water transparency), calcium carbonate deposits (known as oncolites) along the lake bottom, pollution (i.e., mercury and deposition of dissolved solids), and high bacterial levels. In spite of all of the above mentioned problems, there are a variety of fish species inhabiting the lake's oxygenated areas above the hypolimnion.

2.2.16.1 Historically indigenous species like the cisco or lake herring (Corregonus artedii) and other Corregonus spp. as well as the Atlantic salmon are absent from the lake and other indigenous species such as the bowfin (Amia calva) and the northern pike (Esox lucius) are rare.

2.2.16.2 Fishery studies done by the NYSDEC in 1969 and 1980 provide information on the diversity of warmwater fish species the inhabit Onondaga Lake. Except for a well established white perch (Monrone americana) population, the fish species composition in the lake has not changed since State surveys of this water body were made in 1927 and 1946 (Noble and Forney, 1971).

2.2.16.3 As indicated in the summer 1969 Fish Survey Report, midwater trawling was conducted around mid-May to sample adult fish species, as well as in early August when juveniles sampling was also attempted (Noble and Forney, 1971). Ichthyoplankton netting was also done during the sampling in mid-May and mid-June to sample for pelagic fry. Inshore fish were sampled with a gill net in mid-May, mid-June, and early August. Additionally, smaller fish were sampled along the shoreline through the use of a bag seine. The fish survey resulted in the capture of 762 fish - which included 16 different species. The variety of fish species collected included 55 adult carp (Cyprinus carpio), 4 adult

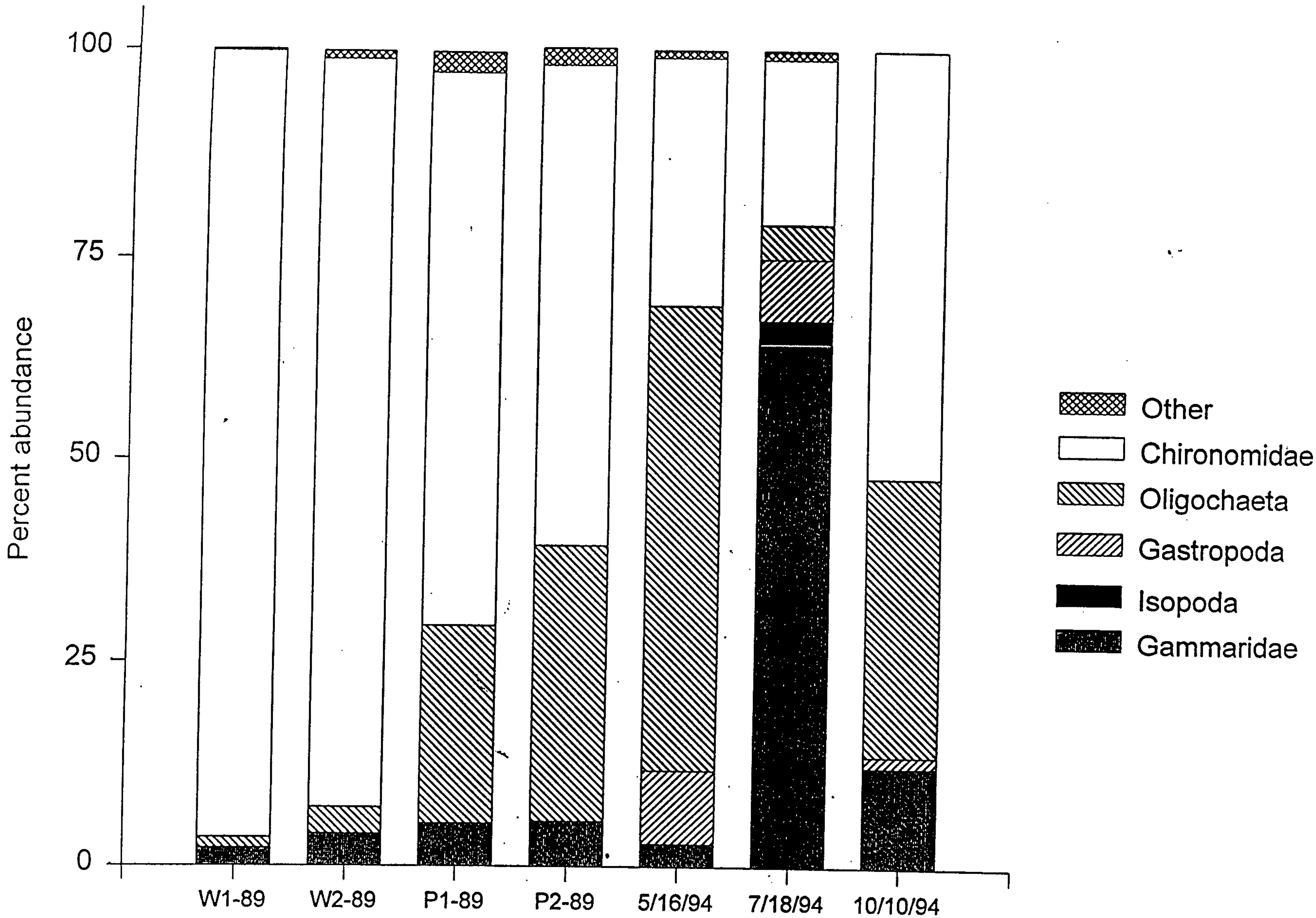



Figure EA-15 Relative abundance of benthic macroinvertebrates in Onondaga Lake, 1989 and 1994. 1989 data are from UFI (1994). W1, W2 and the 1994 results are from sites on the west shore at the former Allied Waste Bed sites. P1 and P2 are on the east shore of the lake.

emerald shiners (Notropis atherinoides), 2 adult and 5 juvenile white suckers (Catostomus commersoni), 6 adult shorthead redhorse suckers (Moxostoma macrolepidotum), 1 redhorse sucker (Moxostoma spp.) , 20 adult channel catfish (Ictalurus punctatus), 3 adult and 3 juvenile brown bullheads (I. nebulosus), 1 adult brook stickleback (Culaea inconstans), 607 adult and 10 juvenile white perch, 5 adult smallmouth bass (Micropterus dolomieu), 1 adult bluegill (Lepomis macrochirus), 3 adult and 3 juvenile pumpkinseeds (Lepomis gibbosus), 22 adult yellow perch (Perca flavescens), 5 adult walleyes (Stizostedion vitreum), and 6 adult freshwater drum(Aplodinotus grunniens). In general, the 1969 survey found that carp appeared to be common and that there was some probable sunfish spawning occurring in the lake. A lack of young-of-the-year yellow perch indicated reproduction was probably not occurring. Few adult fish were captured in the southernmost portion of the lake, and there was a lack of juvenile fish captured along the northwest shoreline. Limited reproductive success of fish on the lake may be attributed to poor substrate quality, scarcity and/or lack of spawning habitat, as well as poor water quality inflow.

2.2.16.4 In July 1980, the NYSDEC conducted another fisheries survey on Onondaga lake, whereby extensive net sampling was utilized. Trap nets, gill nets, as well as beach seines were all used for capturing fish (Chiotti, 1981). The survey captured 4,816 fish, representing 22 different fish species. In addition to 3,015 white perch, 167 pumpkinseed sunfish, 166 yellow perch, 121 smallmouth bass, 114 carp, 109 brown bullhead, 65 channel catfish, 58 white suckers, 45 redhorse suckers, 36 walleye, 21 freshwater drum (sheepshead), and 17 bluegills, ten new species were captured. About 683 alewife (Alosa pseudoharengus), 96 gizzard shad (Dorosoma cepedianum), 56 black crappie (Pomoxis nigromaculatus), 13 northern pike, 5 golden shiners (Notemigonus crysoleucas), 4 bowfin, 1 largemouth bass (Micropterus salmoides), 1 gar (Lipososteus spp.), and 1 lake trout (Salvelinus namaycush) comprised the remainder of the 22 species list. As indicated in the earlier Onondaga Lake Survey Report by Chiotti, coldwater fish species are normally not found in the lake due to limited oxygen levels. The report further indicated that in the 1980 NYSDEC Lake Survey, there were moderate densities of walleye and smallmouth bass found during the net sampling. There was also healthy populations of bullhead, channel catfish, yellow perch, pumkinseed sunfish, and black crappiepresent in the lake. With regard to fish spawning and immigration, the survey mentions that only sporadic reproduction and adult recruitment actually occurs in the lake for a few species. For such species as the walleye and northern pike, they likely access the lake via the outlet from the Seneca river or possibly through other connecting channels.

2.2.16.5 In July 1983, gill and trap net sets were placed in Onondaga Lake by the NYSDEC Region 7 fisheries personnel. Gill net settings for six nights and trap net settings for 12 nights resulted in a catch of 50 smallmouth bass. Most of the settings were placed along the east side of the lake.

2.2.16.6 The most recent fishery investigation involved several months of trap netting during the summer of 1989. The study resulted in the capture of 30 different species. The two most abundant species captured were the white perch and gizzard shad, constituting

nearly 77 percent of the total catch with their numbers equally divided. The next most abundant species were the bluegill 12 percent and the pumkinseed sunfish 4 percent. The remaining 26 species made up only 7 percent o the total catch (Morgan and Ringler, 1990, unpublished data). Game species normally associated with a productive lake of this type such as yellow perch, walleye, smallmouth bass, and largemouth bass were all found in low numbers (less than 1 percent of the catch in most cases). These fish were all taken near the outlet and the very pronounced skew towards two, and at the most, 4 species strongly suggests that this species distribution does not represent a resident profile but instead reflects a jumble of species that move in and out of the lake via the Seneca River. Probably only a very few of these species represent populations that remain in the lake throughout their entire life cycle.

2.2.16.7 Since 1989, SUNY-College of Environmental Science and Forestry has continued work on fisheries of the lake and its tributaries with population studies, assessment of reproductive success, and experimental stocking of Atlantic salmon in major tributaries (Makarewicz, et al, 1994). As in earlier studies, the College has concluded that fish migration between Onondaga Lake and the Seneca River is a major contributor to fish diversity (UFI, 1994). Through the use of ichthyoplankton surveys, the college attempted to determine how much reproduction was taking place within the lake. From April to June, 1994, numerous sample attempts were made to try and capture ichthyoplankton species. Only one ichthyoplanktor was caught and identified. Previous work has suggested that spawning, especially bluegill, pumkinseed sunfish, and white perch did occur in the lake. However, spawning appears to be quite variable from year to year. For example, young-of-the-year bluegill, pumkinseed, and white perch were persistent in large numbers in 1989 and 1990, strongly suggesting reproduction was occurring. The 1994 collections suggest successful spawning was not occurring near the former Allied Waste Beds sites.

2.2.17 Vegetation: The USFWS letter dated July 10, 1995 states the proposed disposal site CDF UDS 5-19 is heavily dominated by phragmites (*Phragmites communis*). Co-dominant trees at the site are eastern cottonwood (*Populus deltoides*) and box elder (*Acer negundo*). There is a lot of overhanging vegetation along the harbor side. The site has been subjected to development impacts as there is urban and commercial development on nearly all sides. The harbor is surrounded by, in addition to the existing upland disposal sites, petroleum tank farms, Barge Canal Terminal and dock facilities, small business facilities, and vacant lots. Due to the highly disturbed nature of the harbor, including highly turbid waters, there was no aquatic vegetation observed.

2.2.17.1 The proposed alternative CDF Site, UDS-20A, is presently being used a as baseball field. The vegetation around the fringe of the field include eastern cottonwood, box elder, goldenrod (*Solidago* spp.), burdock (*Arctium minus*), wild grape (*Vitis* spp.), violet (*Viola* spp.), buckthorn (*Rhamnus* spp.), and choke cherry (*Prunus virginiana*). The field itself is covered with predominantly by bluegrass (*Poa* spp.).

2.2.18 Wildlife: Wildlife habitat cover is sparse in the general project region around the Inner-Harbor area. Waterfowl use in the lakes itself is low, but steady. Some species that have been observed include the mallard (Anas platyrhynchos), black duck (Anas rubripes), blue-winged teal (Anas discors), green-winged teal (Anas carolinensis), scaup (Aythya spp.), and an occasional redhead (Aythya americana). Over the past few years, the flyway pattern has appeared to shift away from the Syracuse metropolitan area (USFWS PAL Letter 1990). Other avian species of songbirds, raptors (i.e., red-tailed hawk) (Buteo jamaicensis), and aquatic species such as the great-blue heron (Ardea herodias) and the belted kingfisher (Megaceryle alcyon alcyon) are found in the project area. The rock dove, or domestic pigeon (Colombia livia) and the American crow (Corvus brachyrhynchos), a scavenger are common. mammalian wildlife that may occur in the general vicinity include eastern gray squirrel (Tamias striatus), raccoon (Procyon lotor), eastern cottontail rabbit (Sylvilagus floridanus), woodchuck (Marmota monax), striped skunk (Mephitis mephitis), opossum (Didelphis marsupialis), muskrat (Ondatra zibethica), and the Norway rat (Rattus norvegicus). An occasional white-tailed deer (Odocoileus virginianus) may be seen in the project area.

2.2.19 Threatened and Endangered Species: The U.S. Fish and Wildlife Service Coordination Act Report stated that except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under Federal jurisdiction are known to exist in the project impact area. The New York State Department of Environmental Conservation did not identify any State endangered or threatened species known to exist in the project impact area.

2.2.20 Wetlands: The only potential wetland areas were found to be located in the existing CDF disposal sites and along the harbor boundary. These areas were formed by past dredging operations that deposited hydric soils, plant materials, and water in the existing sites. These areas for the most part are perturbed areas with phragmites as the dominant plant species present. Phragmites is characteristic of marginal, somewhat saline, wetland areas. These areas are considered to be low quality and have little wetland or wildlife values.

## 3. PROJECT PLAN AND ALTERNATIVES.

This section briefly summarizes the proposed plan and alternative considerations (design/assessment/evaluation).

3.1 Project Alternatives. The following dredging and disposal plan alternatives were considered:

3.1.1 The Original Plan. The initial Inner Harbor dredging plan would have allowed the New York State Canal Corporation to dredge the Inner Harbor area in Syracuse, New York. This proposed project would have involved the removal of approximately 207,000 cubic yards of dredged materials from the Inner Harbor Terminal area and the associated disposal

of the dredge spoils in an adjacent Confined Disposal Facility (CDF). The proposed plan calls for a 100 foot bottom wide channel, 12 feet deep, 2H(height):1(vertical) side slopes, with the entire Inner Harbor Terminal area to be dredged.

3.1.1.1 Proposed Inner Harbor Dredging Project. Sediments in the Inner Harbor area have been analyzed and determined to be suitable for CDF disposal only. The dredge material will be removed from the Inner Harbor area by using a hydraulic dredge. Use of a hydraulic dredge is the preferred method for spoil removal due to the very loose nature of the sediment materials. Use of a hydraulic dredge will help keep most of the turbidity associated with the dredging from reaching the main body of Onondaga lake. A silt curtain may also be employed if needed, at the harbor entrance to further minimize any de-minimis discharges. The dredged material will be pumped through pipes directly into the constructed CDF facility UDS-19. Under this alternative, all of the sediments dredged from the Inner Harbor area would be discharged at what is an existing CDF disposal site. UDS-19 was previously used as a disposal site in 1980. This 9.1 acre site is immediately adjacent to the Inner Harbor and will have to be reconstructed in order to be able to handle the proposed dredged materials (Figure EA-3). Reconstruction will involve the raising the height of the existing dike walls as well as the removal of existing dredged material from UDS 5-19 in order to provide sufficient capacity to contain the sediments. Excavated materials that are not used in the dike wall construction will have to be trucked to and disposed at a permitted landfill. This alternative was selected since UDS-19 was used in the past and its location would allow the use of hydraulic dredging.

3.2 ALTERNATIVE PLANS

3.2.1 No Action: The No-Action alternative implies that no Federal action would be taken regarding the proposed dredging of the Syracuse Inner Harbor project. This alternative was considered, but rejected since it would not provide a solution to the decreased depth in the Inner Harbor terminal area. Ultimately, no action on the proposed plan would lead to decreased commercial and recreational navigation within the Inner Harbor area. In addition, contaminated sediments would be left in the harbor, an area scheduled to be surrounded by new developments in the near future.

3.2.2 Modified Proposed Plan (The Selected Plan). The selected Inner Harbor dredging plan would allow the New York State Canal Corporation to dredge the Inner Harbor area of Syracuse, New York. The proposed project would involve the removal of approximately 60,000 cubic yards of dredged materials from the Inner Harbor Terminal area and the associated disposal of the dredge spoils in an adjacent Confined Disposal Facility (CDF). The proposed plan calls for a 60 foot bottom wide channel, 10 feet deep, 3H (height):1 (vertical) side slopes, with only the first northern-most Inner Harbor Terminal slip area to be dredged. Due to limited disposal area available, the scaled-down modified plan has become the preferred plan for the Inner Harbor Dredging Project.

3.2.3 Alternate Confined Disposal of Dredged Material. Under this alternative, all of the sediments dredged from Syracuse Inner Harbor area would be discharged at the piece of property known as UDS-20A. This site has not been previously used as a disposal site. Presently, this location is being used as a baseball field and is primarily grass with a small wooded sections at one corner. This 10.1 acre site is not immediately adjacent to the Inner Harbor, the material would have to be pumped across Van Rensselaer Street. Also, an entirely new CDF would have to be designed and constructed in order to be able to handle the proposed dredged materials (Figure EA-16). This alternative will be considered only if UDS 5-19 is not sufficient for use as the only CDF site.

## 4. ENVIRONMENTAL EFFECTS

This section briefly summarizes anticipated environmental effects of the proposed project relative to the No Action (Without Project Conditions) Plan and various environmental evaluation parameters.

### 4.1 SOCIAL IMPACTS

4.1.1 Community and Regional Growth:

4.1.1.1 No Action. The Inner Harbor area has been selected by the City of Syracuse, the Lakefront Development Corporation, and the New York State Canal Corporation as an area that will be developed in the near future. The plans for improving the Canal Harbor include a new marina, charter boat facilities, and accommodations for cruise ships, excursion boats, and a variety of other educational and recreational vessels which will directly benefit from the proposed dredging. In conjunction with the Canal Corporation plans for Canal Harbor Development, there is a proposal for the development of a 40 million dollar aquarium on the west bank of the canal. The proposed aquarium may be envisioned as the centerpiece of the development project with an anticipated attendance in excess of 1.2 million visitors per year. This facility is expected to create a captive audience for businesses throughout the Harbor and the surrounding City, and to serve as a major catylast for business development and revitalization in the area. Having a viable harbor to access these new attractions has been identified as a priority by the locally involved officials. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Syracuse Inner Harbor Terminal Area due to shoaling, resulting in decreased water depths within the harbor basin and the navigation channel leading to Onondaga Lake. This may lower the area's potential for desirable community growth with respect to local recreational boating activities associated with the waterfront development plans. The Canal Corporation will be forced to close down its Section Headquaters if it can not access the channel.

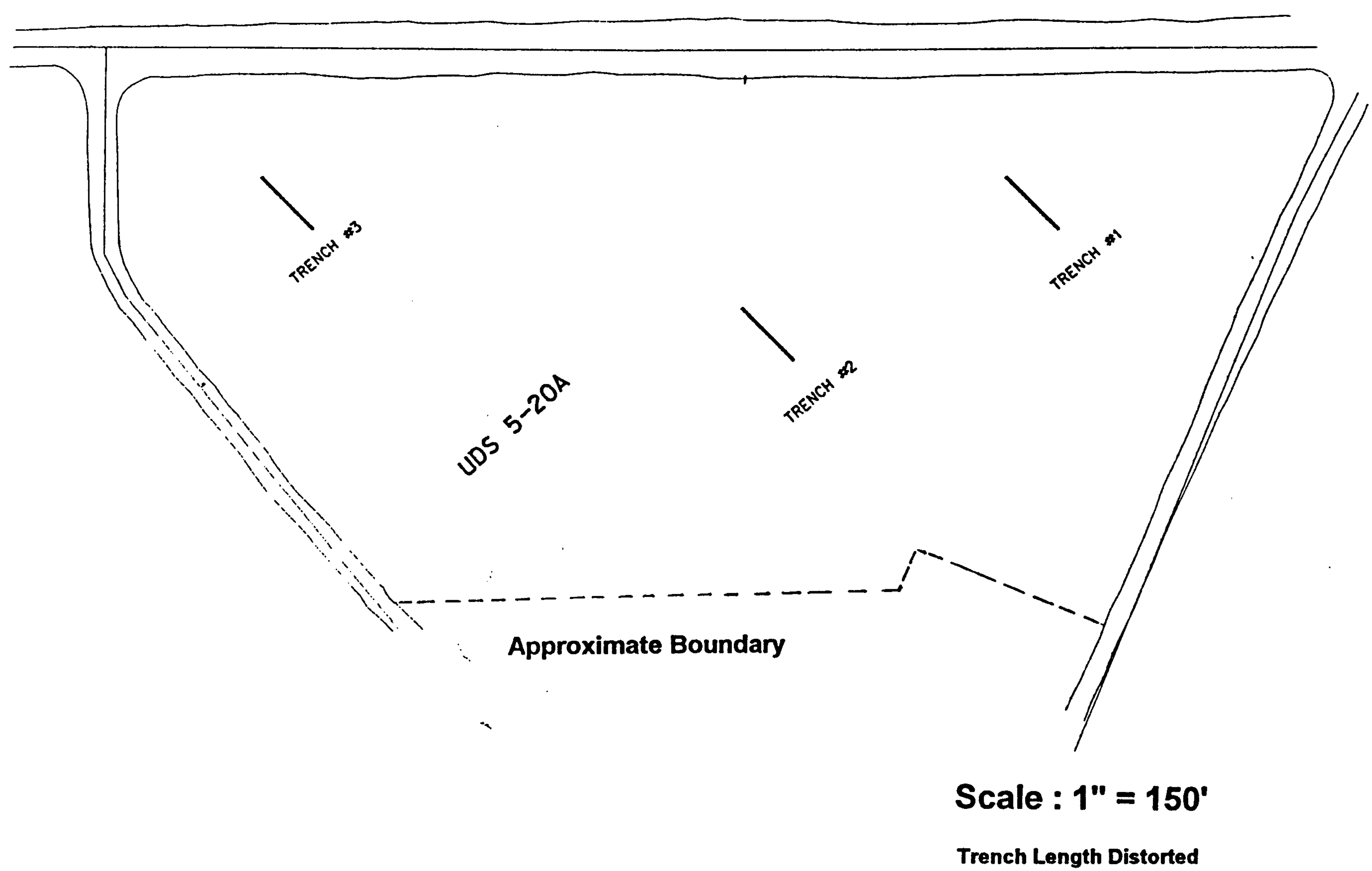



Figure EA-16 - **UDS 5-20A Soil Sampling Locations**

4.1.1.2 Inner Harbor Dredging Plan. Inner Harbor dredging is an essential part of the waterfront plan to facilitate the area's development, and increase the potential for desirable community growth. The dredging of the Inner Harbor would benefit both commercial and recreational navigation and associated enterprises thus contributing to the community's economic and social well-being and facilitating this growth.

4.1.2 Community Cohesion:

4.1.2.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Inner Harbor project area due to decreased water depths in the navigation channels and Inner Harbor terminal area. This may ultimately result in the use of harbor/boating facilities other than those provided in the Inner Harbor, thereby affecting local community cohesion.

4.1.2.2 Inner Harbor Dredging Plan: The maintenance of a viable harbor would contribute to community cohesion by benefitting dependent enterprises and sustaining associated employment and income. It is expected that Federal, State, and local entities will continue to work to resolve Onondaga Lake's water and sediment quality problems and redevelopment plans into the future. Some conflicts pertaining to costs, responsibilities, problems, measures, impacts, effectiveness, clean-up needs, expediency, progress, etc. would be expected. Continued progress in clean-up of the lake and environment, will likely serve to pull the community factions together toward a common goal.

4.1.3 Noise:

4.1.3.1 No Action. As the harbor becomes less navigable due to the cessation of maintenance activities, fewer noise sources (i.e., ships and recreational boats, loading/unloading equipment, plants/factories) would be present in the project area.

4.1.3.2 Inner Harbor Dredging Plan. Noise would be generated by the operation of construction equipment in the vicinity of the dredge operation and disposal facility. Noise generated by the dredging operations in the shoreline vicinity may be disturbing in some cases (Carousel Mall), but would be transient and temporary. No significant long-term adverse noise impacts would be expected due to project implementation, nor would it adversely affect any sensitive noise receptors (i.e., hospitals, schools, etc.). In fact, the noise may actually attract people to the harbor to watch the ongoing dredging operation.

4.1.4 Aesthetics:

4.1.4.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational craft would be able to safely navigate the harbor due to shoaling in the navigation channels. Surrounding harbor structures such as the Canal Terminal Area, any unused docks or piers, etc. could become dilapidated and detract from the visual environment. Shallow waters associated with the shoaling may result in increased turbidity

levels as vessels attempt to navigate through the shallow depths and dislodge sediments. All of the above would detract from the recreational aesthetics of the area.

4.1.4.2 Inner Harbor Dredging Plan. The presence of dredging and construction equipment associated with the operation and maintenance activities would temporarily detract from the aesthetic quality of the project area. The atmospheric exposure of organic matter which may be contained in the dredged material may also result in some short-term, localized malodor. However, the Syracuse Metropolitan Sewage Treatment Facilty is located nearby and already emits undesireable odors within the project area. The odors associated with the dredging operation should not be too different from those that already present within the project area. The re-suspension of fine-grain particulate matter within the water column would result in a temporary reduction in water clarity and apparent alteration in water color at the dredging site. Silt Curtains, placed at the mouth of the Harbor if needed, should prevent most of the suspended materials from reaching the main body of the lake. Any levels of turbidty that does reach the main lake body would be dissipated by local wind patterns and lake currents. This alternative is contributing to the gradual improvement in environmental quality of the Lake, including aesthetics and aesthetic related opportunities.

4.1.5 Recreation:

4.1.5.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Syracuse Inner Harbor area due to shoaling, resulting in decreased water depths in the navigation channels and Terminal Area. This would ultimately reduce use of the harbor by recreational boaters, and negatively impact associated leisure opportunities. The demand for developments to facilitate recreational activities around the project area would continue to be great. These developments would include such activities as swimming, boating, picnicking, hiking/biking, and tennis area all being pursued to the extent possible.

4.1.5.2 Inner Harbor Dredging Plan. Hydraulic dredging activities may temporarily interfere with recreational boating and any associated recreational activities (i.e., fishing) within the harbor during the construction phase. However, all dredging and construction equipment would be sufficiently lighted and marked to avoid any significant hindrance to these activities. The dredging of the harbor will result in a usable navigation channel as well as preserve the availability of safe, sheltered areas for recreational craft. The long-term environmental quality improvements (primarily water and sediment quality and health and safety) would in turn facilitate recreational activities and developments that are associated with aesthetics, parks, swimming, beaches, boating, marinas and services, fishing and access, picnicking, hiking/biking, etc.

4.1.6 Public Health and Safety:

4.1.6.1 No Action. The Inner-Harbor area would continue to silt in until navigation within the harbor was no longer possible. Contaminated sediments within the Harbor area would remain undisturbed.

4.1.6.2 Inner Harbor Dredging Plan. The presence of dredging equipment would create a potentially hazardous environment, particularly for recreational boaters. However, standard Corps of Engineers contract specifications would require the maintenance of a safe, restricted work area during maintenance dredging operations. The Contractor would also be required to comply with Occupational Safety and Health Administration standards. Debris removal and harbor dredging would contribute towards safe commercial and recreational navigation. Also, the removal of contaminated sediments from the water to an upland CDF site will eventually lead to improved water and sediment quality in the lake and inlet.

4.1.7 Cultural Resources:

4.1.7.1 No Action. It is expected that even without the proposed project taking place, other Federal, State, and local entities will continue to work to resolve Onondaga Lake water and sediment quality problems and redevelopment plans into the future. Projects, especially those involving construction activities, may affect cultural resources and will need to be coordinated with cultural resource agencies for clearance and/or possibly mitigation measures. Although construction activities could possibly disrupt cultural resource items, the required coordination would facilitate cultural resource awareness and documentation.

4.1.7.2 Inner Harbor Dredging Plan. It is not expected that the implementation of this project would have any significant adverse impacts upon any cultural resources. Since all dredging activities would be restricted to dredging within the canal (Inner Harbor) it is unlikely that any intact submerged cultural resources would be encountered or disturbed by the dredging equipment. The existing CDF disposal site has been utilized for the discharge of dredged in the past (1980's). Cultural resource investigations and coordination indicate that reconstruction and utilization of the existing CDF disposal site, UDS 5-19 would not significantly affect any cultural resources.

4.1.8 Transportation:

4.1.8.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Inner-Harbor project area due to shoaling, resulting in decreased water depths in the navigation channels. This would ultimately reduce the use of the harbor by commercial and recreational boats, hence, reducing water transportation in the harbor and possibly the surrounding Lake area.

4.1.8.2 Inner Harbor Dredging Plan. The dredging and discharge operations would result in minor, short-term interruptions in commercial and recreational navigation. The dredging of

the Inner Harbor to authorized project depths would permit the continued transit of commercial vessels through the harbor as well as use of harbor by recreational craft.

4.1.9 Land Use:

4.1.9.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Syracuse Inner-Harbor project area due to shoaling, resulting in decreased water depths in the navigation channel and pier areas. This may ultimately discourage use of the area for marina development and other associated land uses.

4.1.9.2 Inner Harbor Dredging Plan. No significant impacts to land would be anticipated as a result of the proposed operation and maintenance project. The land to be used as the proposed CDF site was previously used for this purpose during the 1980's.

## 4.2 ECONOMIC IMPACTS

4.2.1 Business/Industry Employment/Income:

4.2.1.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Syracuse Inner-Harbor project area due to shoaling, resulting in decreased water depths in the navigation channels. Both commercial and recreational navigation and dependent enterprises would be adversely affected resulting in a possible reduction in associated employment, especially at local marina (and related) businesses. Industry around the Lake has declined and recent years and continues to decline, but is beginning to stabilize. Generally, moderate growth in business, employment, and income is anticipated for the area. It is expected that point and non-point sources of pollution will be increasingly addressed. Some remedial actions may be taken to address Onondaga lake water and sediment quality pollution problems to the extent of available and justifiable use of resources. This will likely include pollution source interests resource input. Remedial actions may provide business, employment, and income opportunities for associated establishments periodically. It is likely that water and particularly sediment quality will continue to be of great concern for some time into the future. Associated in-water type activities and developments (swimming, beaches, boating, marinas, fisheries, fishing, access) and associated business, employment, and income opportunities would be limited accordingly.

4.2.1.2 Inner Harbor Dredging Plan. Syracuse Harbor dredging and CDF activities would result in a short-term increase in employment opportunities, specifically in the marine trades. The maintenance of the harbor would help preserve existing employment opportunities associated with their dependent enterprises (i.e. marina interests). Long-term environmental quality improvements (primarily water and sediment quality as well as health and safety) would in-turn facilitate long-term community and regional growth activities and developments and associated business, employment, and income opportunities associated with aesthetics,

parks, swimming, beaches, boating, marinas and services, fishing and access, and supplies, etc.

4.2.3 Property Values and Tax Revenues:

4.2.3.1 No Action. The Onondaga Lake vicinity is undergoing mixed redevelopment with increasing property values and associated tax revenues. Some limited remedial actions may be taken to address Onondaga Lake water and sediment quality pollution problems to the extent of available and justifiable use of alternative resources. It is likely that water and particularly sediment quality will continue to be of great concern for some time into the future. Associated in-water type activities and developments (swimming, beaches, boating, marinas, fisheries, fishing, access) and associated business, employment, and income opportunities would be limited accordingly. Likewise, real estate values and associated tax revenues would also be limited. Some improved conditions would facilitate aesthetics and associated upland development plans (parks, hiking/bike path, museums, restaurants, etc.)and associated area property values and tax revenues. Most of the immediate lake perimeter would be expected to remain as county land.

4.2.3.2 Inner Harbor Dredging Plan. The long-term environmental quality improvements (primarily water and sediment quality as well as health and safety) would in turn facilitate desirable long-term community and regional growth activities and developments associated with aesthetics, parks, swimming, beaches, boating, marinas and services, fishing and access, picnicking, hiking/biking, and supplies etc. Land use could be maintained at existing levels or intensified into higher value developments yielding increased property values and associated tax revenues.

4.2.4 Public Services and Facilities:

4.2.4.1 No Action. Under the "No Action" plan, progressively fewer commercial and recreational vessels would be able to fully utilize the Inner-Harbor area due to shoaling, resulting in decreased water depths in the navigation channels. This would restrict access to, and lessen demands on, any public services and facilities in the harbor. It is expected that point and non-point sources of pollution will be increasingly addressed. Community sewage treatment plants are being upgraded. Some other limited remedial actions may be taken to address Onondaga Lake water and sediment quality pollution problems to the extent available and justifiable use of alternative resources. However, it is likely that water and sediment quality will continue to be of great concern for some time into the future, limiting associated in-water activities and developments.

4.2.4.2 Inner Harbor Dredging Plan. Potential pollution sources (sewage treatment facilities, etc.) will need to be developed and maintained to acceptable levels. The long-term environmental quality improvements (primarily water and sediment quality as well as safety and health) would in-turn facilitate desirable long-term community and regional (public facilities and services) activities and developments associated with aesthetics, parks,

swimming, beaches, boating, marinas and services, fishing and access, and supplies, etc. Associated public facilities and services would need to be developed accordingly. The dredging in the Inner-Harbor area would maintain access to its harbor facilities, thereby continuing demands on those public services and facilities.

## 4.3 ENVIRONMENTAL IMPACTS

### 4.3.1 Natural Resources:

#### 4.3.1.1 Air Quality:

4.3.1.2 No Action. Under the" No Action" plan, no Federal action would be taken to carry out the project. therefore, there would be no project related dust or exhaust emissions from construction work or construction equipment that could temporarily contribute to localized short-term degradation of air quality. Air quality in the near future in the general vicinity of Onondaga lake would probably continue to be about the same as ambient conditions addressed previously in this environmental assessment. In the long-term, air quality may further improve if Federal and State standards are further upgraded and implemented.

4.3.1.3 Inner Harbor Dredging Plan. The operation of dredging and construction equipment in the harbor would result in increased output of pollutants (suspended particulates, nitrogen dioxide, carbon monoxide, etc.) into the local atmosphere. This increased output would be short-term and is not expected to result in significant adverse impact on air quality. Some temporary localized odors associated with the resuspension of disrupted sediments to the water surface, and exposure of dredged organic material to the air environment would also occur. In order to help minimize resuspension of sediments, hydraulic dredging will be used to dredge the harbor. The dredge spoils will be piped directly to the adjacent CDF site UDS 5-19 where they will be allowed to settle out before the waste water is recycled back into the lake.

### 4.3.2 Water Quality:

4.3.2.1 No Action. Under the "No Action" plan, water quality in the harbor would remain the same or slightly improve. This slight improvement in water quality would be a result of stricter regulation of point and non-point source pollution discharges in the harbor. In addition, the decreased harbor use by commercial and recreational crafts would result in a decrease in local water pollution sources (i.e., ships, industrial plants, etc.).

4.3.2.2 Inner Harbor Dredging Plan. Some temporary degradations of local water quality would occur in the harbor as a result of turbidity created by the dredging and dredged material discharge. Such degradations are expected to be short-term and of relatively low-magnitude. Turbidity plumes generated by dredging, dredged material discharge, and construction activities, as well as by minor spillages of supernatant, would be influenced by wave action, wind patterns, and water currents in the vicinity of the harbor and CDF site.

No significant releases of pollutants are expected to be re-introduced into Onondaga Lake as a result of the dredge and disposal actions.

4.3.3 Plankton:

4.3.3.1 No Action. Under the "No Action" plan, phytoplankton primary production and photosynthesis would increase over time as water depths decreased due to shoaling and associated sedimentation.

4.3.3.2 Inner Harbor Dredging Plan. Dredging would have short-term adverse impacts on the phytoplankton and zooplankton in the general vicinity of the water column where the dredging is occurring. Temporary increases in turbidity and suspended solids generated during dredging and discharge operations may cause minor, temporary decreases in phytoplankton primary production and photosynthesis. Discharge of dredged material into the CDF site, which is presently dry, would eventually result in the death of all the planktivorous organisms that where inadvertently dredged up and deposited in the facility. However, the number of organisms lost will be quite small when compared to the whole lake, and will be easily replaced.

4.3.4 Benthos:

4.3.4.1 No Action. Under the "No Action" plan, the benthic community within the vicinity of the harbor would remain at its existing population levels and diversity. However, its existing community structure may change in some way over the long-term as a result of progressively a shallower harbor and associated navigation channel depths.

4.3.4.2 Inner Harbor Dredging Plan. Harbor dredging and dredged material discharge would directly result in the excavation and destruction of benthic macroinvertebrates. The impacted areas would recolonize at relatively fast rates, primarily through the lateral migration of indigenous benthos from surrounding areas. Destruction of benthic (terrestrial) macroinvertebrates would also take place at the CDF Site UDS 5-19, as a result of their burial by discharged dredged material. Benthic macroinvertebrates (aquatic) that are dredged up and disposed in the CDF will also die due to clogged gill filaments by suspended particles, or eventual dessication as the CDF site dried out. After the completion of discharge operations, some upward migration by surviving benthic organisms, as well as lateral migration from surrounding areas, would help recolonize the disturbed areas. Overall, no significant, long term impacts would occur to the benthic community as a result of the proposed Inner-Harbor dredging project.

4.3.4.3 A significant problem associated with dredging the Harbor is the contaminated nature of the sediments. The site has been extensively used for on- and off-loading of petroleum and industrial products and is subjected to surface and sub-surface runoff from nearby petroleum tank farms. The Corps has sampled and had the harbor sediments tested for contaminants. The levels of polyaromatic hydrocarbons (PAH's) are elevated and of

concern. In addition, inorganic contaminants including lead, zinc, cadmium, copper, mercury, and ammonia-n are all found in elevated levels within the sediments, and should result in precautions to be taken to retain the sediments within the CDF.

4.3.5 Vegetation:

4.3.5.1 No Action. Under the "No Action" plan, rooted aquatic plant habitat would increase, hence colonization within the shoaled areas of the harbor's navigation channels and pier areas would take place as water depths continued to decrease.

4.3.5.2 Inner Harbor Dredging Plan. Some terrestrial woody and herbaceous vegetation would be disrupted and/or destroyed during construction of the CDF site. Some minor amounts of aquatic vegetation such as filamentous algae and phytoplankton would also be destroyed during dredging and discharge operations, but would generally re-establish themselves from the surrounding areas following project completion. Suspended sediments within the water column in the general vicinity of dredging areas could also affect aquatic vegetation in the shallower areas of the harbor. As discharge materials settle in the CDF, aquatic plants which prefer hydric soils (i.e., cattail, sedges, rushes, reed canary grass, etc.) would be among the first plant species colonizing the CDF. Over time, as the CDF further dries out, more advanced stages of succession (i.e., shrubs intolerant and tolerant tree species, along with herbaceous plants more characteristic of terrestrial upland soils may colonize the site. However, if the site continues to be used for maintenance dredging, large vegetation will not establish itself. Since the CDF site would contain a concentration of polluted sediment, some limited uptake of pollutants by the established plant and animal species may occur.

4.3.6 Fish and Wildlife:

4.3.6.1 No Action. Under the "No Action" plan, the fish and wildlife community in the vicinity of the harbor would most probably maintain its current state. It is possible that there may be some improvement in species diversity in the long-term as a result of a progressively shallower harbor water depths provide new habitat for different species. However, the subsequent loss of deeper water habitat would ultimately result in decreased species diversity in these areas evening out any gains in shallow water areas. The increased shallow water littoral zones may provide more productive fishery habitat as well as more protective nursery areas.

4.3.6.2 Inner Harbor Dredging Plan. Disruption and disturbance by dredging and construction equipment during harbor dredging and CDF construction activities would result in a short-term avoidance of impacted areas by fish and wildlife species. Turbidity generated during dredging and any maintenance activities would have a short-term adverse impact on fish by aggravating their gill systems. Local wildlife species would also tend to avoid the project area during operation and maintenance activities. Although there may be some limited uptake of contaminants from the sediments placed in the CDF site into the food chain

(most notable in sediment and bottom-dwellers), it is not expected to have any acute or long-term adverse effects on the aquatic life or other wildlife dependent on aquatic or terrestrial ecosystems. The project site is in a highly urban setting with little or no wildlife habitat available to attract large numbers of wildlife species.

4.3.7 Wetlands:

4.3.7.1 No Action. Continued siltation in the Inner-Harbor and their adjacent areas may eventually result in the creation of some wetlands, particularly along the littoral zone where Onondaga Creek empties into Onondaga Lake. However, it would be expected that these wetlands would only be of marginal quality due to the existing contamination, and the surrounding urban setting.

4.3.7.2 Inner Harbor Dredging Plan. Harbor dredging and CDF construction activities will not significantly affect any wetlands. Project coordination was initiated with the U.S. Department of the Interior - Fish and Wildlife Service (USFWS), the U.S. Environmental Protection Agency (USEPA), and the New York State Department of Environmental Conservation (NYSDEC). Based on this coordination, and review of the USFWS - National Wetlands Inventory Maps and the NYSDEC - Protected Freshwater Wetland Maps, and field inspection, no wetland areas were identified that would be affected by the proposed project implementation. The proposed CDF site was previously used as a site in 1980 and is presently dominated by phragmites. The site is subject to development impacts as there is much urban and commercial development on nearly all sides.

4.3.8 Threatened and Endangered Species:

4.3.8.1 No Action. Under the "No Action" plan, future conditions in the harbor are not expected to provide critical habitat for any Federal or State threatened or endangered species.

4.3.8.2 Inner Harbor Dredging Plan. It is not expected that project construction activities would significantly affect any threatened and/or endangered species. Project coordination was conducted with the USFWS and the NYSDEC. The USFWS in their response indicated that except for possibly occasional transient species, no Federally listed endangered, threatened, or proposed for listing species under their jurisdiction are known to exist in the project impact area and that no adverse impact due to project implementation would be expected in this regard. NYSDEC provided information relative to State species, but did not identify any State protected-species or associated habitats that would be impacted by project implementation.

## 5. ENVIRONMENTAL COORDINATION AND COMPLIANCE

5.1 NEPA compliance with pertinent Federal and State environmental protection statutes has been attained as follows:

5.1.1 Preservation of Historical Archaeological Data Act of 1974, 16 USC et seq.; National Historic Preservation Act of 1966, as amended, 16 USC 470 et seq.; Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 13, 1971). Project coordination was initiated with the U.S. Department of the Interior National Park Service, and the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP). NYSOPRHP-State Historic Preservation Officer (SHPO) indicated in their response (July 27,1995) that, based on review of material submitted, it is their opinion that the project will have no effect/impact on those characteristics of any properties in the project area which would qualify them for inclusion in the State and National Registers of Historic Places. The notification certifies compliance with Federal S 106 and State S14.09 Preservation Laws.

5.1.2 Clean Air Act, as amended, 42 USC 7401 et seq. Project coordination was initiated with the U.S. Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC). As indicated in this EA, no significant adverse impacts to air quality would be expected due to project implementation. Some temporary malodor may be associated with the discharge of the dredged material in the constructed CDF UDS 5-19. This EA is being coordinated with USEPA and NYSDEC in this regard.

5.1.3 Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 USC 1251 et seq. Project coordination was initiated with USEPA, NYSDEC and other Federal, State, and local interests, in this regard (Appendix EA-D). Protection of water quality in the project vicinity from any significant adverse impacts was a critical consideration item throughout the project planning process. A Clean Water Act Public Notice and Section 404 (b) (1) Evaluation Report have been prepared for coordination with this EA (Appendix EA-B). No significant adverse impact to water quality would be expected due to project implementation. By this notice, a Clean Water Act Section 401 Certification, or waiver thereof, is requested from NYSDEC.

5.1.4 National Environmental Policy Act, 42 USC 470a, et seq. Alternative plans are developed and evaluated in accordance with environmental considerations as set forth by this Act, as promulgated by the Department of the Army's: Principles and Guidelines; ER 200-2-2 Environmental Quality - Policies and Procedures for Implementing NEPA. Requirements of the Act are accomplished via the Corps planning process.

5.1.5 River and Harbor Act, 33 USC 401 et seq. Requirements of this Act are fulfilled by standard Corps planning actions. All 17 points identified in Section 122 of the Act have been evaluated in this EA.

5.1.6 Fish and Wildlife Coordination Act, 16 USC 661 et seq. Project coordination was initiated with the USFWS and NYSDEC. These agencies provided information and assessment pertaining to fish and wildlife resources and threatened or endangered species and/or habitat in the project vicinity. The USFWS indicated in their response that they

would not expect any significant adverse impacts to fish and wildlife resources due to implementation of the proposed project. (Appendix EA-C).

5.1.7 Endangered Species Act, as amended, 16 USC 1531 et seq. Project coordination was initiated with the USFWS and NYSDEC. USFWS indicated that except for possibly occasional transient species, no Federally listed endangered, threatened, or proposed for listing species under their jurisdiction are known to exist in the project impact area and that no adverse impact due to project implementation would be expected in this regard (letter dated July 10, 1995). NYSDEC, responsible for information relative to State species, did not identify any State protected species or associated habitats that would be impacted by normal operation or maintenance activities (no comments received).

5.1.8 Wild and Scenic Rivers Act, 16 USC 1271 et seq. Project coordination was initiated with the National Park Service. Also, in accordance with the National Wild and Scenic Rivers Act, Public Law 90-542, the final lists of rivers identified as meeting the criteria for eligibility dated January 1981, and amendments were consulted. Onondaga Lake and its tributaries were not listed.

5.1.9 Federal Water Project Recreation Act, as amended, 16 USC 460-1(12) et seq. In Planning the proposed activities, full consideration has been given to opportunities afforded to outdoor recreation and fish and wildlife enhancement. The proposed harbor dredging and disposal activities are desirable from this recreational perspective. It would provide additional harbor protection by continuing to provide for boat docking and related activities in the harbor, removal of contaminated sediments from a recreational area, and maintain pier/breakwater fishermen and pedestrian recreational viewing access.

5.1.10 Executive Order 11988, Flood Plain Management, May 24, 1977. The Corps of Engineers has concluded that there is no practicable alternative to the proposed activities which would occur within the base floodplain of Onondaga Lake, and that the recommended actions are in compliance with the Order.

5.1.11 Executive Order 11990. Protection of Wetlands, May 24, 1977. Project coordination was initiated with USFWS, USEPA, and NYSDEC. This coordination and review of the USFWS - National Wetlands Inventory Maps, and the NYSDEC - Protected Freshwater Wetlands Maps, and field inspection indicated no wetlands areas that would be affected by the proposed Inner Harbor dredging and adjacent CDF disposal. CDF site UDS 5-19 is presently dominated with phragmites, a wetland species, but the site is dry in nature.

5.1.12 Farmland Protection Policy Act (PL 97-98),and Executive Memorandum - Analysis of Impacts on Prime and Unique Farmlands, CEQ Memorandum, August, 30, 1976. Project coordination will be initiated with the U.S. Department of Agriculture - National Resource Conservation Service (NRCS) during the Environmental Assessment review process. The project area has been previously used as a disposal area and should have no impacts on any farmlands or farming activities.

# 6. AGENCIES/PUBLIC CONTACTED

This section briefly summarizes National Environmental Policy Act (NEPA) environmental coordination and compliance.

6.1 Study activities are coordinated with government agencies, interest groups, and the general public. The general intent is to gain assistance in: identifying and scoping existing conditions, problems, needs, and concerns; developing feasible alternative solutions; and assessing, evaluating, and identifying preferred and selected plans. This study's public involvement process incorporates public meeting/workshops, written correspondence, telephone communication, and NEPA/CWA review procedures.

6.2 The following representatives, agencies, and interests have been coordinated with pertaining to this project:

Federal

U.S. Environmental Protection Agency
U.S. Department of the Interior
  Fish and Wildlife Service
U.S. Coast Guard
U.S. Department of Housing and Urban Development
U.S. Federal Emergency Management Plan (FEMA)

State

New York State Department of Environmental Conservation
New York State Department of Transportation
New York State Office of Parks, Recreation and Historic
  Preservation
New York State Department of Health

Regional and Local

Central New York Regional Planning and Development Board
Onondaga County Agencies:
- Planning Agency
- District Conservationist
- Environment Management Council
- Department of Drainage and Sanitation
- Department of Parks and Recreation

Onondaga Lake Advisory Committee
Syracuse Community Development
City of Syracuse

Regional and Local Cont.

Town of Salina
Town of Geddes
Village of Solvay
Village of Liverpool
Onondaga Lake Management Conference

SYRACUSE INNER HARBOR
ONONDAGA LAKE

DRESSING AND CONFINED
DISPOSAL OF DREDGED MATERIAL
ONONDAGACOUNTY, NEW YORK

REFERENCES APPENDIX EA-A

U.S. ARMY CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

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# Onondaga Lake
# Inner Harbor Dredging Design Project
# Syracuse, NY

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## New York State
## 401 Water Quality Certificate

New York State Department of Environmental Conservation
Division of Environmental Permits, Suite 206
615 Erie Blvd. W., Syracuse, NY 13204-2400
(315) 426-7438

John P. Cahill
Commissioner

March 10, 1998

John R. Dergosits, P.E.
New York State Canal Corporation
200 Southern Boulevard
Albany, NY 12201-1089

RE: Permit for Water Quality Certification #7-3115-00275/00001

Dear Mr. Dergosits:

Enclosed please find the above referenced permit. This permit allows for the dredging of sediments from the Syracuse Inner Harbor area. This permit should be kept on file at the affected site. It will expire on 12/31/99.

If there are any questions, please contact this office.

Sincerely,

Robert A. Torba

Robert A. Torba
Deputy Permit Administrator

cc: DOW - R7, S. Eidt
R. Nolan
L. Gumaer
C. Branagh
B. Daigle, Albany
E. Thomee, Albany

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

# PERMIT

Under the Environmental Conservation Law (ECL)

| DEC PERMIT NUMBER | EFFECTIVE DATE |
|---|---|
| 7-3115-00275/00001 | 3/11/98 |
| FACILITY/PROGRAM NUMBER(S) | EXPIRATION DATE(S) |
| | 12/31/99 |

TYPE OF PERMIT (Check All Appropriate Boxes)

☒ NEW  RENEWAL  MODIFICATION  PERMIT TO CONSTRUCT  ☒ PERMIT TO OPERATE

| | | |
|---|---|---|
| ☐ ARTICLE 15, TITLE 5: PROTECTION OF WATER | ☐ ARTICLE 17, TITLES 7, 8: SPDES | ☐ ARTICLE 27, TITLE 9; 6NYCRR 373: HAZARDOUS WASTE MGMT. |
| ☐ ARTICLE 15, TITLE 15: WATER SUPPLY | ☐ ARTICLE 19: AIR POLLUTION CONTROL | ☐ ARTICLE 34: COASTAL EROSION MANAGEMENT |
| ☐ ARTICLE 15, TITLE 15: WATER TRANSPORT | ☐ ARTICLE 23, TITLE 27: MINED LAND RECLAMATION | ☐ ARTICLE 36: FLOODPLAIN MANAGEMENT |
| ☐ ARTICLE 15, TITLE 15: LONG ISLAND WELLS | ☐ ARTICLE 24: FRESHWATER WETLANDS | ☐ ARTICLES 1, 3, 17, 19, 27, 37; 6NYCRR 380: RADIATION CONTROL |
| ☐ ARTICLE 15, TITLE 27: WILD, SCENIC & RECREATIONAL RIVERS | ☐ ARTICLE 25: TIDAL WETLANDS | ☐ ARTICLE 27, TITLE 3, 6NYCRR 364: WASTE TRANSPORTER |
| X 6NYCRR 608: WATER QUALITY CERTIFICATION | ☐ ARTICLE 27, TITLE 7: 6NYCRR 360: SOLID WASTE MANAGEMENT | ☐ OTHER: |

| PERMIT ISSUED TO | TELEPHONE NUMBER |
|---|---|
| New York State Canal Corporation | 518-471-5010 |
| ADDRESS OF PERMITTEE | |
| 200 Southern Boulevard, Albany, NY 12201-0189 | |
| CONTACT PERSON FOR PERMITTED WORK | TELEPHONE NUMBER |
| John R. Dergosits P.E. | 518-471-5020 |
| NAME AND ADDRESS OF PROJECT/FACILITY | |
| | |
| LOCATION OF PROJECT/FACILITY | |
| West of Onondaga Creek between Bear Street and Hiawatha Boulevard | |

| COUNTY | CITY | WATERCOURSE | NYTM COORDINATES |
|---|---|---|---|
| Onondaga | Syracuse | Onondaga Creek | E: N:4 |

DESCRIPTION OF AUTHORIZED ACTIVITY:

The hydraulic dredging of about 60,000 cubic yards of sediment from the Syracuse Inner Harbor area with placement in the reconstructed Upland Disposal Site (UDS) 5-19.

**By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, the General Conditions specified (see page 2) and any Special Conditions included as part of this permit.**

| PERMIT ADMINISTRATOR: | ADDRESS | |
|---|---|---|
| Robert A. Torba | 615 Erie Boulevard West, Syracuse, NY 13204 | |
| AUTHORIZED SIGNATURE | DATE | |
| Robert A. Torba | March 11, 1998 | Page 1 of 6 |

# GENERAL CONDITIONS

**Inspections**

1. The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71-0301 and SAPA 401(3). A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

**Permit Changes and Renewals**

2. The Department reserves the right to modify, suspend or revoke this permit when:
   a) the scope of the permitted activity is exceeded or a violation of any condition of the permit or provisions of the ECL and pertinent regulations is found;
   b) the permit was obtained by misrepresentation or failure to disclose relevant facts;
   c) new material information is discovered: or
   d) environmental conditions, relevant technology, or applicable law or regulation have materially changed since the permit was issued.

3. The permittee must submit a separate written application to the Department for renewal, modification or transfer of this permit. Such application must include any forms, fees or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing.

4. The permittee must submit a renewal application at least:
   a) 180 days before expiration of permits for State Pollutant Discharge Elimination System (SPDES), Hazardous Waste Management Facilities (HWMF), major Air Pollution Control (APC) and Solid Waste Management Facilities (SWMF); and
   b) 30 days before the expiration of all other permit types.

5. Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

**Other Legal Obligations of Permittee**

6. The permittee has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature and by whomever suffered, arising out of the project described in this permit and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from this project.

7. The permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

8. The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required for this project.

## Additional General Conditions

FOR ARTICLES 15 (Title 5), 24, 25, 34, 36 and 6 NYCRR Part 608

9. That if future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expenses to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

10. That the State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

11. Granting of this permit does not relieve the applicant of responsibility of obtaining any other permission, consent or approval from the U.S. Army Corps of Engineers, U.S. Coast Guard, New York State Office of General Services or local government which may be required.

12. All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

13. Any material dredged in the prosecution of the work herein permitted shall be removed evenly, without leaving large refuse piles, ridges across the bed of a waterway or floodplain or deep holes that may have a tendency to cause damage to navigable channels or to the banks of a waterway.

14. There shall be no unreasonable interference with navigation by the work herein authorized.

15. If, upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expenses to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill or restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

16. If granted under Article 36, this permit does not signify in any way that the project will be free from flooding.

17. If granted under 6 NYCRR Part 608, the NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

18. All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or his agent as part of the permit application. Such approved plans were prepared by US Army Corps of Engineers in June 1997, entitled Final Onondaga Lake Inner Harbor Dredging Disposal Project.

| | | |
|---|---|---|
| DEC PERMIT NUMBER<br>7-3115-00275/00001 | | |
| FACILITY ID NUMBER | PROGRAM NUMBER |  |

## Special Conditions

### Water Quality Certification (6NYCRR 608)

19. The New York State Department of Environmental Conservation, Division of Environmental Permits, 615 Erie Boulevard W., Syracuse, NY, shall be notified 15 working days prior to the actual start of dredging.

20. All dredging shall take place between March 1 and October 1.

21. All dredged material shall be discharged into Upland Disposal Site (UDS) 5 - 19 located on the west bank of Onondaga Creek between Bear Street and Hiawatha Boulevard.

22. Care shall be taken to minimize damage to the stream, bed and bands.

23. No petroleum products, nor excessive amounts of silt, clay, or mud shall be permitted to enter the lake, stream, or wetlands.

24. The NYS Dept. of Environmental Conservation hereby certifies that the referenced project will comply with all applicable provisions of the Clean Water Act of 1977 (PL 95-217), provided that all Special Conditions are met.

<u>Project Scope</u>

25. The dredged area shall be confined to the area designated in the Final Design Memorandum sent to the Department in June 1997.

26. Riparian disposal facility shall designed such that berm and bottom permeability is less than .27 inches/hour.

27. The dredge dewatering facility must provide at LEAST two hours detention time at all operating conditions.

28. Ponding depth must be maintained at a three (3) foot depth or greater.

29. Weir overflow rate should not exceed one (1) cfs per linear foot of weir.

30. The outflow structure must be designed with a baffle.

31. The discharge structure must be 'erosion free'.

32. The facility shall be maintained and operated to prevent uncontrolled release of sediments beyond the boundary of the site or to surface water.

| DEC PERMIT NUMBER<br>7-3115-00275/00001 | NYS Canal Corporation | |
|---|---|---|
| FACILITY ID NUMBER | PROGRAM NUMBER | PAGE 4 OF 6 |

| Outfall Number & Discharge Limitations Effluent Parameter | Daily Avg. | Daily Max. | Units | Minimum Monitoring Requirements Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Flow | | 8 | cfs | Continuous | Instantaneous |
| Metals: Hg, Cd, Pb, Cu | | Monitor | mg/l | See note 2 below for monitoring frequency | |
| Organics: PAH (total), Anthracene, Benzo (a) anthracene, Chrysene, BTX (sum of), Benzene, MEK, Trichloroethylene | | Monitor | mg/l | See note 2 below for monitoring frequency | |
| Ammonia | | Monitor | mg/l | See note 1 below for monitoring frequency | |
| Turbidity | | Monitor | NTU | See note 1 below for monitoring frequency | |
| Total Suspended Solids | | 400 | mg/l | See below for monitoring frequency | |

2,3,7,8 TCDD may EITHER be monitored as Note 1, **or** monthly for the first eight months, quarterly after.

**Monitoring Frequency** (conditional on the discharge pollutants existing at levels not exceeding permit limits) Monitoring is only required be performed during the time of active dredging.

**Note 1:**

First week of discharge: daily

Weeks two through eight (to the two month mark): weekly

Months three through eight (six months): monthly

Months nine through project life: quarterly

**Note 2:**

First week of discharge: Three samples taken during the first week, on non-consecutive days

Weeks two through eight (to the two month mark): weekly

Months three through eight (six months): monthly

Months nine through project life: quarterly

**Note 3:** All monitoring data must be submitted to NYSDEC Region 7 Regional Water Engineer. Submittal shall include copies of the lab data, a summary of the results and details and explanations of all values exceeding water quality standards for the receiving water body. Additionally, the Regional Water Engineer must be notified immediately if it is found that the discharge is violating any limit as stated above.

Two hours following the conclusion of daily dredging activities the pond depth may be gradually lowered to two (2) feet. Depth is to be lowered in a manner to assure that no sediment will be resuspended and discharged.

## Special Conditions

### Water Quality Certification (6NYCRR 608)

33. Bird aversion features must be in place from July 15 thru September 15 inclusive. The department recommends that "Large Eye" spheres be attached at intervals on wire suspended along the poles used to support the baffles. These "eyes" can be acquired from various garden supply houses. Agway Inc. stores may also be able to provide them.

34. The dredge spoil site must be monitored for bird use during periods when there is no snow cover. The results of this monitoring will be used to establish future measures for protection of avian fauna, if necessary. The department suggests two organizations that may be able to provide and execute an appropriate monitoring protocol:

    S.U.N.Y. EST @ Syracuse
    Contact: Dr. Guy A. Baldassarre
    (315) 470-6739

    Onondaga Audobon Society
    Contact: Bob Asanoma
    (315) 451-5554

35. The monitoring Protocol shall be reviewed and approved by Regional Wildlife Staff prior to monitoring activities. Wildlife Staff will be available to discuss the plan during its preparation.

36. Post dredging chemical analyses of Sediments shall be performed according to the following:

- The number of suficial sediment samples that are to be collected will be no more than the samples collected for the project application.
- The sample locations will be at or near the previously collected sample locations submitted with the application.
- The analyses to be performed will be consistent with the analyses conducted for the application.
- A letter report of findings will be provided to the NYSDEC approximately 90 days after the completion of dredging.

| DEC Permit #7-3115-00275/00001 | NYS Canal Corporation | |
|---|---|---|
| FACILITY ID NUMBER | PROGRAM NUMBER | PAGE 6 OF 6 |

# SYRACUSE INNER HARBOR
# ONONDAGA LAKE

## DREDGING AND CONFINED
## DISPOSAL OF DREDGED MATERIAL
## ONONDAGA COUNTY, NEW YORK

## SECTION 404 (a) PUBLIC NOTICE AND
## SECTION 404 (b) (1) EVALUATION
## APPENDIX EA-B

U.S. ARMY CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF:
CENCB-PE-EA

# Public Notice

SYRACUSE INNER HARBOR
ONONDAGA COUNTY, NEW YORK

DREDGING AND CONFINED
DISPOSAL OF DREDGED MATERIAL

This Public Notice has been prepared and distributed pursuant to Section 404(a) of the Clean Water Act (33 USC 1344). Its purpose is to specify what dredged materials would be discharged into waters of the United States by implementation of the proposed action. This notice provides the opportunity for any person who may be affected by such discharges to submit comments or request a public hearing.

The U.S. Army Corps of Engineers, Buffalo District, has prepared an Environmental Assessment (EA) and Section 404(b)(1) Evaluation pertaining to the proposed dredging of the Syracuse Inner Harbor and discharge of the associated dredged material in compliance with the National Environmental Policy Act of 1969, as amended, and Clean Water Act, as amended. These documents are presented with this Public Notice. Preliminary assessment of the impacts of the discharge of the dredged material (as discussed in the Section 404[b][1] Evaluation applying the Guidelines for Specification of Disposal Sites for Dredged or Fill Material in 40 CFR 230) concludes that the proposed action would not cause unacceptable disruption to the water quality uses of the affected aquatic ecosystem.

Onondaga Lake in central New York just outside the City of Syracuse in Onondaga County, New York (Figure 1). The Inner Harbor area is situated at the southeast end of Onondaga Lake just west of downtown Syracuse (Figures 2 & 3). Shoaling in the Inner Harbor area occurs at a relatively rapid rate. Sediments primarily from Onondaga Creek as well as from the surrounding watersheds, streambanks, and shorelines gradually fill in the Inner Harbor area. A major source of sedimentation came from a mud boil field located upstream in Tully Valley (Figure 4). At one point, it was estimated that the mud boils were

discharging 30 tons of sediment per day into Onondaga Creek. The installation of a diversion channel reduced the load to 15 tons per day. The subsequent installation of a temporary dam (bladder) further reduced the load to under 0.5 tons per day. Presently, the load entering the stream has increased to approximately 3 tons per day. The future installation of depressurizing wells and the construction of a permanent dam with flash boards is expected to once again reduce the load to only minor leakages. As a result, the Inner Harbor needs to be dredged in order to maintain sufficient depths for commercial and recreational navigation. The purposes of the project are not only to maintain adequate conditions for safe and efficient commercial and recreational navigation, but also improve water and sediment quality within the Inner Harbor area by removing contaminated sediments.

The selected Syracuse Inner Harbor dredging plan would allow the New York State Canal Corporation to dredge the Inner Harbor in Syracuse, New York. The proposed project would involve the removal of approximately 60,000 cubic yards of dredged materials from the Inner Harbor area and the associated disposal of the dredge spoils in an adjacent Confined Disposal Facility (CDF). The proposed plan calls for a 60 foot bottom wide channel, 10 feet deep, 3H (height):1 (vertical) side slopes, with only the first northern-most Inner Harbor Terminal slip area to be dredged. Due to the small size of UDS 5-19, the scaled-down modified plan has become the preferred plan for the Inner Harbor Dredging Project.

Sediments from within the Inner Harbor have been analyzed and determined to be suitable only for placement in a Confined Disposal Facility (CDF). The dredge material will be removed from the Inner Harbor area by using a hydraulic dredge. Use of a hydraulic dredge is the preferred method for spoil removal due to the very loose nature of the sediment materials present in the harbor. Use of a hydraulic dredge will help keep most of the turbidity associated with the dredging from reaching the main body of Onondaga Lake. A silt curtain may also be employed as needed in the harbor entrance to further minimize any de-minimis discharges during the dredging operation. The dredged material will be pumped through pipes directly into the reconstructed CDF facility UDS 5-19 (Figure 3).

The proposed plan calls for the sediments dredged from the Inner Harbor area to be discharged at an existing CDF disposal site. UDS 5-19 was previously used as a disposal site in 1980. This 9.1 acre site is immediately adjacent to the Inner Harbor and will be reconstructed to handle the proposed dredged materials (Figure 5). This alternative was selected since UDS 5-19 was used in the past and its location would allow the use of hydraulic dredging. Dredge material proposed for disposal at UDS 5-19 is compatible both physically and chemically with on-site material. Reconstruction will involve raising the height of existing dike walls as well as the removal of existing dredge materials from UDS 5-19 in order to provide additional capacity to contain newly excavated sediments. The reconstructed dikes will result in very low permeability dikes which will adequately retain dredge sediments and associated contaminants.

The latest published version of the National Register of Historic Places has been consulted. There are no registered historic properties or archaeological sites, or properties or sites listed as being eligible for inclusion therein that would be affected by this project. By this notice, the National Park Service is advised that currently unknown archaeological, scientific, prehistorical, or historical data may be lost or destroyed by the discharge activities.

Based on the review of available environmental data, we have determined that the proposed discharges would not affect any species proposed or designated by the U.S. Department of the Interior as threatened or endangered, nor would it affect the critical habitat of any such species. Therefore, unless additional information indicates otherwise, no additional formal consultation pursuant to Section 7 of the Endangered Species Act Amendments of 1978 will be undertaken with the U.S. Fish and Wildlife Service.

This project is being reviewed under the following applicable laws:

(a) National Environmental Policy Act of 1969, as Amended, 42 USC 4321, et seq.

(b) Clean Air Act of 1955, as Amended, 42 USC 7401, et seq.

(c) Clean Water Act of 1977, as Amended (Federal Water Pollution Act), 33 USC 1251, et seq.

(d) Water Protection and Flood Prevention Act, 16 USC 1001, et seq.

(e) Fish and Wildlife Coordination Act of 1958, as Amended, 16 USC 661, et seq.

(f) Endangered Species Act of 1973, as Amended, 16 USC 1531, et seq.

(g) Land and Water Conservation Fund Act, as Amended, 16 USC 4601-11, et seq.

(h) Federal Water Project Recreation Act, as Amended, 16 USC 406-1(12), et seq.

(i) Archeological and Historical Preservation Act, as Amended, 16 USC 469, et seq.

(j) National Historic Preservation Act of 1977, as Amended, 16 USC 470a, et seq.

State Water Quality Certification (or waiver thereof) from the New York State Department of Environmental Conservation (NYSDEC) is required for this action, under Section 401 of the Clean Water Act. The Buffalo District hereby requests Water Quality Certification, or waiver thereof, for the dredging activities and associated discharges in the Onondaga Lake Inner Harbor Terminal Area. The design details for the discharge of water from the CDF Site UDS 5-19 as a result of the dredging operations will be addressed in the Design Memorandum.

This notice is published in conformance with Title 33 Code of Federal Regulations 209.145. Copies of this notice have been sent to the following Federal, State and local agencies, and organizations (individuals are not listed):

Congressional

U.S. Senator - Daniel P. Moynihan
U.S. Senator - Alphonse D'Amato
U.S. Representative - James T. Walsh

Federal

Advisory Council on Historic Preservation
Federal Emergency Management Administration
Federal Maritime Commission
U.S. Coast Guard
U.S. Department of Agriculture - Soil Conservation Service
U.S. Department of Commerce - National Oceanic and
Atmospheric Administration
U.S. Department of Energy
U.S. Department of Health and Human Services
U.S. Department of Housing and Urban Development
U.S. Department of the Interior - Fish and Wildlife Service
U.S. Department of the Interior - National Park Service
U.S. Department of Transportation
U.S. Environmental Protection Agency

State

Office of the Governor
New York State Department of Commerce
New York State Department of Environmental Conservation
New York State Department of Health
New York State Department. of Transportation
New York State Office of Parks, Recreation, and Historic Preservation

Local

Central New York Regional Planning Board
Onondaga County Planning Agency
City of Syracuse
Town of Salina
Town of Geddes

Local (cont'd).

Village of Solvay
Village of Liverpool
Onondaga County Environmental Management Council
Onondaga County Dept. of Parks and Recreation
Commissioner of Syracuse Community Development
Onondaga County Soil and Water Conservation District
Onondaga County Dept. of Drainage and Sanitation

Other Organizations:

Onondaga Lake Management Conference
Onondaga Lake Advisory Committee

Any interested parties and/or agencies desiring to express their views concerning the proposed discharge may do so by filing their comments, in writing, no later than 30 days from the date of issuance of this notice. A lack of response will be interpreted as meaning that there is no objection to the proposed discharge.

Any person who has an interest which may be affected by the discharge of this dredged material may request a public hearing. The request must be submitted in writing to the District Commander within 30 days of the date of this notice and must clearly set forth the interest which may be affected, and the manner in which the interest may be affected.

Correspondence pertaining to this matter should be addressed to the District Commander, U.S. Army Corps of Engineers, Buffalo District, 1776 Niagara Street, Buffalo, New York, 14207-3199, ATTN: Mr. William A. Janowsky. If you have any questions or require additional information, please contact Mr. Janowsky of my Environmental Analysis and Engineering Branch at commercial number (716) 879-4394 [FAX (716) 879-4355].

Michael J. Conrad, JR.
Lieutenant Colonel, U.S. Army
Commanding

Attachments

**NOTICE TO THE POSTMASTER**: It is requested that this notice be conspicuously displayed for 30 days from the date of this issuance.

**SECTION 404(b)(1) EVALUATION**

SYRACUSE INNER HARBOR
ONONDAGA LAKE

DREDGING AND CONFINED
DISPOSAL OF DREDGED MATERIAL

## 1. INTRODUCTION

1.1 Shoaling in the Inner Harbor terminal area, the highly modified mouth of Onondaga Creek, occurs at a relatively rapid rate. The primary source of shoaling in the harbor is the deposition of stream bedloads and suspended sediments carried by Onondaga Creek. A secondary cause of shoaling is the transportation of sediments into the harbors navigational channels by littoral drift and Onondaga Lake surges and storm events. The primary source of creek sedimentation can be attributed to land subsidence due to solution salt mining that took place in the late 1800's into the early 1900's. Tully Valley, approximately 15 miles upstream of Onondaga Lake, was an area that recieved heavy salt mining pressure. A small unnamed tributary [Water Index Number (WIN) 20B] drains the hillside area to the west of the valley and south of Otisco Road (Figure 4). A small area in the valley through which this tributary flows has subsided causing a mud deposition area. Groundwater flowing through this depositional area comes to the surface resulting in a mud boil phenomenom. The tributary is clear before entering this area and muddy after leaving to enter Onondaga Creek. The water in Onondaga Creek above this confluence is clear, it is the mud boil field that is adding the sediment load to Onondaga Creek. Other secondary sources of sediment loading include surface water runoff from urban, industrial and rural land-use activities, and industrial, municipal and agricultural point and non-point source discharges within the Tully Valley drainage basin.

1.2 The accumulations of shoals within the harbor channels is impeding the use of the harbor by primarily recreational as well as commercial vessels. Consequently, the removal of these shoals would facilitate safe navigation, thereby benefiting recreational and commercial activities. Dredging to proposed project dimensions would result in the removal of approximately 60,000 cubic yards of material. Dredging creates a need for a suitable discharge site for the dredged material.

1.3 Section 404(b)(1) of the Clean Water Act (33 USC 1344) requires that discharge sites and dredged or fill material to be discharged into navigable waters of the United States be evaluated through the application of guidelines developed by the Administrator of the U.S. Environmental Protection Agency (USEPA) in conjunction with the Secretary of the Army. The purpose of this Section 404(b)(1) Evaluation is to assess the impacts of the discharge of dredged and fill material from the Inner Harbor area at the proposed discharge site. The

primary focus of this evaluation is the assessment of recent sedimentary quality data obtained for Onondaga Lake Inner Harbor area and the proposed disposal site, CDF UDS 5-19.

## 2. PROJECT DESCRIPTION

### 2.1 Location and Description of Existing Project.

2.1.1 Onondaga Lake in central New york, is located entirely within Onondaga County at the northern end of the City of Syracuse. The lake flows from the southeast to the northwest and discharges into the Seneca River and eventually into Lake Ontario via the Oswego River, formed by the confluences of the Seneca and Oneida Rivers (Figures 1 and 2). Onondaga Lake, with a total drainage area of 245 square miles and a surface area of 4.6 square miles is part of the New York State Barge Canal system. The City of Syracuse is located along the south shore of the lake. The Inner-Harbor area extends from the New York State Department of Transportation (NYSDOT) Barge Canal Terminal on Onondaga Creek to the deeper water depths of Onondaga Lake.

2.1.2 The Inner Harbor area is situated at the southeast end of Onondaga Lake just west of downtown Syracuse (Figure 2). Shoaling in the Inner Harbor area occurs at a relatively rapid rate. Sediments primarily from Onondaga Creek as well as from the surrounding watersheds, streambanks, and shorelines gradually fill in Inner Harbor Terminal area. As a result, the Inner Harbor needs to be dredged in order to maintain sufficient depths for commercial and recreational navigation. The purpose of the project is not only to maintain adequate conditions for safe and efficient commercial and recreational navigation, but also improve water quality within the Inner Harbor are by removing contaminated sediments.

### 2.2 General Description of the Action.

2.2.1 **The Proposed Action** - The selected Syracuse Inner Harbor dredging plan would allow the Canal Corporation to dredge the Syracuse Inner Harbor, New York. The proposed project would involve the removal of approximately 60,000 cubic yards of dredged materials from the Inner Harbor area and the associated disposal of the dredge spoils in an adjacent Confined Disposal Facility (CDF) (Figure 3). The proposed plan calls for a 60 foot bottom wide channel, 10 feet deep, 3H (height):1 (vertical) side slopes, with only the first northern-most Inner Harbor Terminal slip area to be dredged (Figure 5). Due to the small size of UDS 5-19 the scaled-down modified plan has become the preferred plan for the Inner Harbor Dredging Project.

2.2.2 Sediments from within the Inner Harbor have been analyzed and determined to be suitable only for placement in a Confined Disposal Facility (CDF). The dredge material will be removed from the Inner Harbor area by using a hydraulic dredge. Use of a hydraulic dredge is the preferred method for spoil removal due to the very loose nature of the sediment materials present in the harbor. Use of a hydraulic dredge will also help keep most of the turbidity associated with the dredging from reaching the main body of Onondaga lake. A silt

curtain may also be employed at the harbor entrance if needed to further minimize any de-minimis discharges during the dredging operation. The dredged material will be pumped through pipes directly into the constructed CDF facilty UDS 5-19.

2.2.3 The proposed plan calls for the sediments dredged from Inner Harbor area to be discharged at what is an existing CDF disposal site. UDS 5-19 was previously used as a disposal site in 1980. This 9.1 acre site is immediately adjacent to the Inner Harbor and will be re-constructed in order to be able to handle the proposed dredged materials (Figure 3). This alternative was selected since UDS 5-19 was used in the past and its location would allow the use of hydraulic dredging.

2.3 Authority. The original cleanup plan for Onondaga Lake was authorized by: Resolution, Committee of the Environment and Public Works of the U.S. Senate, June 1989. The current project, the proposed inner harbor dredging and confined disposal construction was authorized by Congress under Section 401 of the Great Lakes Critical Programs Act of 1990 (Public Law 101-596). The Assistant Secretary of the Army for Civil Works, acting jointly with the Administrator of the Environmental Protection Agency and the Governor of the State of New York convened a management conference for the restoration, conservation, and management of Onondaga Lake in 1991. The Onondaga Lake Management Conference is composed of representatives of the Assistant Secretary of the Army for Civil Works, the Administrator of the Environmental Protection Agency and the Governor of the State of New York (New York State Department of Environmental Conservation and Attorney General of New York State), Onondaga County, New York, and the City of Syracuse, New York. This Management Conference passed a resolution on 10 December 1991 that "resolved that the Onondaga Lake Management Conference authorizes and directs the U.S. Army Corps of Engineers (Buffalo District) to proceed, in conjunction with the Lakefront Development Office of the City of Syracuse; to dredge and improve the Inner Harbor at the southern end of Onondaga Lake within the funds made available to the U.S. Army Corps of Engineers." Subsequently, the Assistant Secretary of the Army for Civil Works approved the expenditure of a portion of the fiscal year 1992 Onondaga Lake appropriation ($350,000) for the planning and design of a dredging project at the Onondaga Lake - Onondaga Creek Inner Harbor.

2.4 General Description of the Dredged Material.

2.4.1. **Preliminary Evaluations of the Dredged Materials.**

2.4.1.1 *Source of Sediments Comprising the Shoal Material* - Sediments in Onondaga Inner Harbor Area accumulate primarily as a result of sedimentation from Onondaga Creek. A major source of creek sedimentation, the Tully Mud Boils, can be attributed to land subsidence possibly due to solution salt mining that took place in the late 1800's into the early 1900's (See Section 1.1). A secondary cause of shoaling is the transportation of sediments into the harbor's navigational channels by littoral drift and Onondaga Lake surges and storm events.

2.4.1.2 *Potential Sources of Sediment Pollution* - There are numerous sources that are contributing to the contamination of the Inner Harbor area. The two primary sources are municipal and industrial discharges.

2.4.1.3 Over the years, the Lake has served as a water supply and receptacle for wastes for municipalities and industries. As a result, the water quality has deteriorated significantly. The discharges of municipal effluents and industrial wastes have left the lake polluted and hypereutropic. Onondaga Lake experiences anoxic conditions in its hypolimnion, very large algae crops and algal macronutrient content, and poor water transparency (Meyer and Effler 1980). Water transparency in the Lake is generally less than 4 feet due to high concentrations of phytoplankton, calcium carbonate, and clays. The fecal coliform standards are frequently violated following high runoff events primarily as a result of combined sewer overflows (CSO's), thus prohibiting swimming (Auer 1989; Auer and Niehaus 1989; Effler 1988; Heidtke 1989. The fishery is impacted on by mercury contamination of fish flesh, inadequate dissolved oxygen levels, and the losses of suitable fish habitat (Brooks and Effler, 1989; Effler, Brooks, Auer, and Doerr, 1990). Excessive chlorides make the Lake's freshwater unnaturally saline and also prevents the top and bottom waters from mixing (lake turnover), thus resulting in low or depleted oxygen levels (Flocke 1990). The oxygen depletion problem is so severe that adequate concentrations for support of fish life are often limited to the upper 4-5 meters of the water column during the warmer summer months. During the fall mixing period, the New York State standard of 4 milligrams per liter for dissolved oxygen is violated because of oxygen-demanding reduced chemical species accumulated in the bottom waters during the summer (Effler, Hassett, Auer, and Johnson 1989; Effler, Perkins, and Brooks 1987). The high phytoplankton concentration occurs because the phosphorus and nitrogen loadings. Sources of phosphorus include the Metropolitan Sewage Treatment Plant and combined sewer overflows, internal recycling for bottom sediments and from non-point sources.

2.4.1.4 Tributaries have been identified as one of the primary sources for the discharge of the municipal and industrial wastes into Onondaga Lake. Numerous tributaries which flow into Onondaga Lake receive urban and rural run-off and point source effluent discharges from municipal and industrial sources. Ninemile Creek receives treated wastewater from the village of Camillus and Marcelles and overflow and infiltration from the wastebeds of Allied Chemical Corporation. Forty-five combined sewer overflows discharge to Onondaga Creek. Two CSO's enter Ley Creek, as well as two sewer overflows at the Brooklawn and Ley Creek pump stations. Harbor Brook receives discharge from 19 CSO's of the Hillcrest and Brookside pump stations. Tributary 5A receives treated wastewater from Crucible Steel. Bloody Brook receives no significant pollutant point sources with the exception of some treated coolant and wastewater from the General Electric Corporation's Park Complex.

2.4.1.5 The tributary which has the most direct influence on the water quality found within the Inner Harbor is Onondaga Creek. Onondaga Creek, located at the southeastern end of Onondaga Lake, drains a watershed area of about 115 square miles. The watershed encompasses much of the City of Syracuse and extends south into the Tully Valley. Forty-

five CSO's discharge into the Creek. Based upon recent monitoring data, it appears that the water quality of the Creek is degraded with elevated concentrations of fecal coliform bacteria, salts, and the heavy metals, lead, copper, and chromium. Additionally, sources of high sediment load carried by the Creek have been identified in southern Tully Valley. The Creek flows into Onondaga Lake at the Syracuse Inner Harbor area, the proposed project location. The NYSDEC water quality classification for Onondaga Creek from its mouth upstream to Temple Street in Syracuse is Class "D"; from Temple Street upstream to Tributary 5B the Creek is designated as being Class "B"; from this tributary upstream to the source of Onondaga Creek the Classification is "C" (best usage is form fishing and any other use except for bathing, as a source of water supply for drinking, culinary, or food processing purposes).

2.4.1.6 *General Physical Aspects of the Sediments* - Historic and recent sediment particle size analyses show that sediments in the Harbor are comprised primarily of silts and clays. Sediments from the proposed CDF disposal site, UDS 5-19 showed silt and clay at lower lying areas with mixtures of silt and sand at higher elevevations within the site.

2.4.1.7 *Sediment Grain Size and Quality as Determined by Previous Analyses* - Not Applicable.

2.4.1.8 *Preliminary Evaluations of the Dredged Material Using Previous Analyses* - See Section 2.4.2.

2.4.2 <u>Characteristics of the Dredged Materials</u>: In 1995, Engineering and Environment, Inc. (EEI) performed some chemical and physical testing on Inner Harbor dredge sediments. These tests are described in the following paragraphs.

As indicated previously, the U.S. Army Corps of Engineers, Buffalo District has sampled and analyzed sediments from the Inner Harbor area and the proposed CDF disposal site (Figures 1, 2, and 3). This analysis is utilized to help determine appropriate dredging and disposal procedures. Material dredged the Inner Harbor area was analyzed and found to be suitable for CDF disposal only, not for open-lake disposal, and therefore will be disposed at UDS 5-19.

2.4.2.1 Sediment sampling locations for the Inner Harbor are shown in Figure 6. Sediment sampling locations at the proposed disposal area, UDS 5-19 (Trenches 1- 5) are shown in Figure 4.

2.4.2.2 Both bulk chemical total analyses and Toxic Characteristic Leaching Procedure (TCLP) analyses were conducted on candidate dredge material. Results of bulk chemical analyses are summarized in Table 1. TCLP analytical results are summarized in Table 2. The bulk chemical analyses show that the sediment proposed for dredging from the Inner Harbor has elevated levels of lead, cadmium, copper, ammonia-N, poly aromatic hydrocarbons (PAH's), and methyl ethyl ketone (MEK). There are low levels of PCB's and

the chlorinated pesticides DDE, DDT, and DDD. Dieldrin was not detected. Elevated mercury levels from sampling locations 1 and 2 reflect the overall high mercury levels of Onondaga Lake from past chemical manufacturing. Very low levels of para-dioxin (2,3,7,8 TCDD) were measured.

2.4.2.3 TCLP tests were conducted to ascertain if any of the sediments exhibited the Resource Conservation Recovery Act (RCRA) toxicity characteristic. Table 2 compares the range of values found in the sediment to regulatory levels under RCRA. The data shows very little leaching of toxic constituents under the stringent acid-leaching conditions of the TCLP leaching procedure and far below the regulatory standard. Disposal of sediments is therefore not subject to RCRA regulation. However, the elevated levels of metal and some organic contaminants as previously discussed makes it necessary to dispose of sediments in a secured confined disposal facility (CDF) or a licensed landfill.

2.4.2.4 Site UDS 5-19 (Figure 5) is proposed for disposal of sediments to be dredged from the Inner Harbor. Samples were taken at five locations as shown in Figure 6 for physical and chemical testing. Table 3 gives the particle size distribution of samples from site UDS 5-19. Trenches 1 and 2 were essentially mixtures of sand and silt while trenches 4 and 5 from lower lying areas were mixtures of silt and clay with no sand. Recompacted permeability of the silt and clay material was tested as only 18 cm/yr indicating that the dikes constructed of this material would be highly impermeable to passage of water or chemical constituents.

2.4.2.5 Tables 4 through 8 summarize chemical test data for the five test locations at UDS 5-19. As might be expected, the finer grained sediments from trenches 4 and 5 which are most representative of the overall site, contain somewhat higher levels of inorganic and organic contaminants. This includes elevated levels of the metals cadmium, chromium, copper, lead, zinc, xylene, tri-methyl benzene, phthalates, and an array of PAH's. low levels of PCB's ($\sim$0.5 to 5 mg/kg) were found at trenches 1, 2, 4, and 5. The chlorinated pesticides endosulfan, methoxychlor, DDE, DDD, toxaphene, and endrin ketone were found at various trench locations.

2.4.2.6 The data shows that the dredge material proposed for disposal at UDS 5-19 has similar contamination as the dredge material already disposed of at this site. The levels of contaminants in the material proposed for disposal at UDS 5-19 is about the same as levels at the site. It is concluded that the material proposed for disposal at UDS 5-19 is compatible both physically and chemically with dredge material already in place.

2.4.2.1 *Physical Analyses* - Particle size tests on proposed dredge material showed it to be a loose mixture of primarily silt and clay as shown in Table 3.

2.4.2.2 *Inorganic Analyses* - Discussed in Section 2.4.2.

2.4.2.3 *Organic Analyses* - Discussed in Section 2.4.2.

2.4.2.4 *Sediment Sampling and Biological Analyses* - No biological testing conducted. Biological impacts discussed in Section 3.

2.4.2.5 *Conclusions Regarding the Open-Water Discharge of Dredged Material*: Not Applicable.

2.4.3 **Quantity of Dredged Materials** - The dredging of Onondaga Lake Inner Harbor would involve the removal and discharge of an estimated 60,000 cubic yards of sediments.

2.4.4 **Sources of Dredged Materials** - The bottom sediments would be dredged from the navigation channels of Onondaga Lake Inner Harbor project area. The immediate sources of the dredged material are bed and suspended loads carried by Onondaga Creek into the harbor.

2.5 <u>Description of the Proposed Discharge Sites</u>.

2.5.1 **Location** - The proposed plan calls for the sediments dredged from the Inner Harbor area to be discharged at what is an existing CDF disposal site. UDS 5-19 was previously used as a disposal site in 1980. This 9.1 acre site is immediately adjacent to the Inner Harbor and will be re-constructed in order to be able to handle the proposed dredged materials (Figures 3 and 5). This alternative was selected since UDS 5-19 was used in the past and its location would allow the use of hydraulic dredging. Dredge material proposed for disposal at UDS 5-19 is compatible both physically and chemically with on-site material. Reconstruction of dikes with on-site material will result in low permeability dikes which will adequately retain dredge sediments and associated contaminants.

2.5.2 **Size of Site** - The proposed disposal area is located on a 9.1 acre parcel of land. The dredged material wet volume of approximately 60,000 cubic yards will be placed in the CDF UDS 5-19. The dredged material volume is expected to reduce by one third, resulting in about 40,000 cubic yards of dry material. These estimates do not include additional water from hydraulic dredging. Water from hydraulic dredging will add between two and three times the volume (120,000 to 180,000 cubic yards or up to 36 million gallons). Design of the weir requires at least a two feet deep pool below the bottom height of the weir. Design of the dikes will also require two feet of freeboard.

2.5.3 **Type of Site** - The Site CDF UDS 5-19 is confined.

2.5.4 **Type of Habitat** - The USFWS letter dated July 10, 1995 states the proposed disposal site CDF UDS 5-19 is heavily dominated by phragmites (<u>Phragmites</u> <u>communis</u>). Co-dominant trees at the site are eastern cottonwood (<u>Populus</u> <u>deltoides</u>) and box elder (<u>Acer negundo</u>). There is a lot of overhanging vegetation along the harbor side. The site has been subjected to development impacts as there is urban and commercial development on nearly all sides. The harbor is surrounded by, in addition to the existing upland disposal sites, petroleum tank farms, Canal Terminal and dock facilities, small business facilities, and

vacant lots.

2.5.5 **Timing and Duration of Discharge** - During the scoping letter review period, there were no requests for date restrictions received from either the U.S. Fish and Wildlife Service or the N.Y. State Department of Environmental Conservation. The Inner Harbor Terminal Area has been so adversely impacted by surrounding urban development, there is no significant fish spawning expected to take place within the harbor. Therefore, dredging and disposal activities can take place at the New York State Canal Corporation's convenience. The dredging and associated discharges of dredged material would require two dredging seasons to complete due to the expected settling time needed for the dredged materials.

2.6 Description of the Discharge Method.

2.6.1 The dredge material will be removed from the Inner Harbor area by using a hydraulic dredge. Use of a hydraulic dredge is the preferred method for spoil removal due to the very loose nature of the sediment materials present in the harbor. Use of a hydraulic dredge will help keep most of the turbidity associated with the dredging from reaching the main body of Onondaga lake. A silt curtain may also be employed at the harbor entrance to further minimize any de-minimis discharges during the dredging operation as needed. Sediments dredged from the Inner Harbor would be discharged at the existing CDF Site UDS 5-19 by pumping the dredge materials through a pipe(s) directly from the Inner Harbor Area into the CDF Site. Dewatering of the dredge material will take place within the CDF, with excess water being returned to the Inner Harbor through a weir and outfall pipe. It is expected that suspended sediment discharge will be between 200 to 250 ppm and that the water quality standards of Onondaga Lake will not be exceeded.

## 3. FACTUAL DETERMINATIONS

3.1 Physical Substrate Determinations.

3.1.1 **Substrate Elevation and Slope** - Not applicable for a CDF disposal site. UDS 5-19 was previously used as a CDF site for Inner Harbor dredge spoils in 1980. The existing CDF will be excavated, reconfigured, and reused as a disposal area for the Inner Harbor dredge sediments.

3.1.2 **Substrate Type** - Substrate at the CDF UDS 5-19 disposal site is comprised of a mixture of silts and clays as well as some silts and sands.

3.1.3 **Dredged Material Movement** - Movement of the deposited dredged material at the CDF Site UDS 5-19 would be negligible. Dredge material proposed for disposal at UDS 5-19 is compatible both physically and chemically with on-site material. Reconstruction of dikes with on-site material will result in low permeability dikes which will adequately retain dredge sediments and associated contaminants.

3.1.4 **Physical Effects on Benthos** - The discharge of dredged material at the CDF Site UDS 5-19 would result in the mortality of most of the macroinvertebrates that are entrapped during the hydraulic dredging and disposal process. No effects on benthos related to pollutants would occur, since the sediment to be discharged is similar with respect to physical and chemical characteristics. Resident macroinvertebrates at the CDF Site may also be destroyed by suffication as dredge sediments are deposoited on them. After burial, some upward migration of surviving benthic macroinvertebrates would probably occur. Lateral migrations from surrounding indigenous benthic communities would contribute most to the recolonization of impacted areas within the site. Benthos which inhabit the dredged material may also play a role in site recolonization.

3.2 Water Circulation and Salinity Determinations.

3.2.1 **Water:**

3.2.1.1 *Salinity* - Salinity determinations are not applicable to this Section 404(b)(1) evaluation since Onondaga Lake is a freshwater lake and the disposal area is an upland site.

3.2.1.2 *Chemistry* - The results of analyses performed on sediment samples collected from the Inner Harbor and the proposed CDF Site UDS 5-19 sites are discussed in Subsection 2.4 of this Section 404(b)(1) Evaluation. Since the dredged material will be discharged at and upland disposal facility after adequate settling time, there should only be some slight, temporary changes in water chemistry within the Harbor area. These changes would occur as a result of the discharge water returning to the harbor after the dredge sediments have settled out in the CDF Site. The water returning to the Harbor would have the same chemical properties as those already found in the Harbor waters, so therefore no significant degradation of water chemistry would occur. No significant alteration in pH would be expected to occur as a result of the discharge of dredged material at the site.

3.2.1.3 *Clarity* - Not applicable to the upland CDF disposal area. Some temporary increases in turbidity and suspended solid levels would occur in the Inner Harbor Area during the hydraulic dredging operation. This would result in short-term reductions of water clarity within the Inner Harbor Area. Any turbidity plume that might be produced would be controlled by the installation of a silt curtain at the mouth of the Harbor entrance (Onondaga Creek) if needed.

3.2.1.4 *Color* - Not applicable - Discharge of dredged material is taking place at an upland CDF site, not an open water disposal area.

3.2.1.5 *Odor* - The area to be dredged in the Inner Harbor is made up of an very thick layer of organic materials that has been deposited from Onondaga Creek. It is expected that there will be a moderate amount of malodors associated with the dredged material being deposited at the CDF disposal site. These effects are expected to be short term in nature and will dissipate after project completion.

3.2.1.6 *Taste* - Not applicable - Discharge of dredged material is taking place at an upland CDF site, not an open water disposal area.

3.2.1.7 *Dissolved Gas Levels, Nutrients and Eutrophication* - Not applicable - Discharge of dredged material is taking place at an upland CDF site, not an open water disposal area. During and for a short period of time (i.e., hours) following dredged material discharge operations, gas levels, including methane ($CH_4$), may increase around the CDF site. These increased methane levels would not result in any significant adverse impacts since they would dissipate into the atmosphere relatively quickly. No significant adverse impacts with regard to eutrophication would occur as a result of the proposed dredged material discharge operations.

3.2.2 **Current Patterns and Circulation**:

3.2.2.1 *Current Patterns and Flow* - No significant impacts would occur in this regard as a result of the discharge of dredged material at the upland CDF disposal site.

3.2.2.2 *Velocity* - No significant impacts would occur in this regard as a result of the discharge of dredged material at upland CDF disposal site.

3.2.2.3 *Stratification* - No significant impacts would occur in this regard as a result of the discharge of dredged material at the upland CDF disposal site.

3.2.2.4 *Hydrologic Regime* - No significant impacts would occur in this regard as a result of the discharge of dredged material at the upland CDF disposal site.

3.2.3 **Normal Water Level Fluctuations** - No Effect.

3.2.4 **Salinity Gradients** - Not applicable (refer to paragraph 3.2.1.1 of this Section 404[b][1] Evaluation).

3.2.5 **Actions Taken to Minimize Impacts** - The Contractor would be required to restrict the discharge of dredged material within the boundaries of the upland CDF disposal site so that any impacts on the land or water surrounding the Inner Harbor Area would be localized. The Contractor would be required to handle the dredged material in a manner which would minimize spillage of supernatant associated with the dredged material during transport (piping) to the CDF disposal site. The Contractor would be required to minimize accidental spills of fuel, oil and/or grease. The Contractor would be responsible for the installation and maintenance of silt curtain across the mouth of the Harbor if needed in order to minimize any de minimis discharges of sediments out of the Inner Harbor.

3.3 Suspended Particulate/Turbidity Determinations.

3.3.1 **Expected Changes in Suspended Particulates and Turbidity in the Vicinity of the**

**Discharge Site** - Not applicable - Discharge of dredged material is taking place at an upland CDF site, not an open water disposal area. There will be temporary increases in turbidity and suspended solid levels within the Harbor area itself as a result of the dredging operations. The expected increases in suspended particulates and turbidity levels are expected to be minor and of short duration (i.e., several days). Any turbidity plume that might develop would be controlled by siltation curtain that will be installed at the mouth of the harbor.

3.3.2 **Effects on Chemical and Physical Properties of the Water Column:** Only minor, short-term impacts on the chemical and physical characteristics of the water column are expected during dredged material discharge operations at the open-lake disposal sites. The results of chemical analyses on the sediments proposed to be discharged are discussed in Subsection 2.4 of this Section 404(b)(1) Evaluation.

3.3.2.1 Light Penetration - Temporary increases in turbidity and suspended solid levels would likely cause short-term moderate decreases in light penetration in water within the Inner Harbor Area.

3.3.2.2 Dissolved Oxygen - DO levels in the water column may be temporarily lowered in the Harbor as a result of dredged material suspension in the water column.

3.3.2.3 Toxic Metals and Organics - No significant impacts with regard to toxic metals or organics would occur in the water column since the discharge of the dredge material will take place outside of the water column at an upland CDF disposal site. There may be some temporary resuspension of contaminated sediments during the dredging operation, but there are no significant increases expected in the concentration of toxic metals or organic compounds within the water column.

3.3.2.4 Pathogens - Conditions conducive to botulism outbreaks and waterfowl mortality may exist during the latter stages of CDF filling. Conditions favorable to botulism bacteria (Clostridium botulinum) include warm, shallowwaters, anaerobic decomposition, and fairly clean water. The bacteria produce a toxin which can be ingested by water birds, ultimately resulting in death.

3.3.2.5 Aesthetics - Temporary increases in turbidity could cause minor decreases in light penetration, and minor aesthetic impacts at the site(s). However, the natural turbidity in the Harbor is already sufficiently high, and any increases in turbidity levels may not present an excessive change.

3.3.3 **Effects on Biota**:

3.3.3.1 *Primary Production and Photosynthesis* - Temporary increases in turbidity and suspended solids generated during dredging operations may cause minor and very temporary decreases in primary production and photosynthesis in the Inner Harbor area. Reduced light

penetration into the water column may have a temporary effect on the phytoplankton community at these sites.

3.3.3.2 *Suspension/Filter Feeders* - Some temporary adverse impacts on suspension and filter feeders in the Inner Harbor area may occur as a result of the temporary increases in turbidity and suspended solids generated by dredged material discharge operations. The effects of dredging operations on benthic organisms at this site would occur as described in paragraphs 3.1.4 and 3.5.2 of this Section 404(b)(1) Evaluation.

3.3.3.3 *Sight Feeders* - Temporary adverse impacts on sight feeders (i.e., fish, birds and some benthos) in the Inner Harbor area may occur as a result of the temporary increases in turbidity and suspended solids. Some relatively sedentary organisms may be destroyed as they are hyraulically dredged and deposited at the adjacent CDF Site UDS 5-19, as with the benthic macroinvertebrates discussed in paragraphs 3.1.4 and 3.5.2 of this Section 404(b)(1)Evaluation. Mobile sight feeding aquatic species (such as fish and birds) may temporarily avoid the Inner Harbor area during dredging operations.

3.3.4 **Actions Taken to Minimize Impacts** - The Contractor would be required to restrict the discharge of dredged material within the boundaries of the selected CDF site, so that impacts on benthos, fisheries and water quality would be restricted within the site. If the existing CDF Site, UDS 5-19 is used, environmental impacts will be limited (i.e., on benthos, fisheries, water quality) to a site that has been previously utilized for the discharge of Inner Harbor dredged material. The Contractor would be required to handle the dredged material in a manner which would minimize spillage of supernatant associated with the dredged material during transport to the discharge site. The Contractor would be required to minimize accidental spills of fuel, oil and/or grease. A silt curtain at the mouth of Onondaga Creek (Harbor entrance) may also be required in order to reduce the amount of turbid waters reaching the main body of the lake.

3.4 Contaminant Determinations.

3.4.1 The term "contaminant" is defined by USEPA Guidelines, 40 CFR 230.3(e) as "a chemical or biological substance in a form that can be incorporated into, onto, or be ingested by and that harms aquatic organisms, consumers of aquatic organisms, or users of the aquatic environment, and includes but is not limited to the substances on the 307(a)(1) list of toxic pollutants promulgated by USEPA on January 31, 1978 (43 CFR 4109)."

3.4.2 Subsection 2.4 of this Evaluation presents the results of chemical analyses performed on Inner Harbor sediments, and the CDF Site UDS 5-19 sediments. The results of *chemical analyses* performed on sediment samples from the Inner Harbor area and the proposed CDF Site UDS 5-19 show that the sediments to be discharged at the CDF site are somewhat contaminated and proper precautions for disposal are necessary. These results are presented in Subsection 2.4 of this Evaluation.

3.5 Aquatic Ecosystems and Organisms Determinations.

3.5.1 **Effects on Plankton** - Only minor, short-term, adverse impacts would occur to plankton in the Inner Harbor area, due to limited, temporary increases in turbidity and suspended solid levels during dredging operations. The anticipated effects of dredged material discharge on the local phytoplankton community are discussed in paragraph 3.3.3.1 of this Section 404(b)(1) Evaluation.

3.5.2 **Effects on Benthos** - The discharge of dredged material into the CDF site would result in the burial and mortality of some benthic organisms, as discussed in paragraph 3.1.4 of this Evaluation. Benthic organisms in the dredged material transported to the CDF site may play a role in reconstructing the benthic community at the site. In addition, invasion of the impacted site from lateral benthic communities may occur, also contributing to benthic recolonization. Impacts to benthos due to the addition of contaminants from the dredged material would be minimal.

3.5.3 **Effects on Nekton** - Nektonic organisms (fish and other larger free-swimming aquatic animals) would temporarily be dispersed from the Inner Harbor Area during dredged operations, as discussed in paragraph 3.3.3.3 of this Evaluation. No toxicological effects to nekton would occur as a result of the discharge of dredged material at the upland disposal site. Most nekton would simply avoid the Inner Harbor Project Area during dredging and discharge operations, and would return after the project was completed.

3.5.4 **Effects on Aquatic Food Web** - Only minor temporary effects to the aquatic food web are expected to occur in the Inner Harbor and at the CDF disposal site as a result of the mortality of some benthic organisms as discussed in paragraphs 3.1.4 and 3.5.2 of this Evaluation. There may be some exposure of contaminated sediments to the aquatic food web during the dredging and disposal operations. However, There will be no new contaminants being added to the project area. The Harbor already contains contaminated sediments, and the existing CDF Site UDS 5-19 has been used as a disposal area for these sediments in the past. Other effects would be reflected in the effects on plankton and nekton from physical, rather than chemical impacts. Following the completion of dredged material discharge operations, rapid recolonization of the CDF disposal site by indigenous species is anticipated.

3.5.5 **Effects on Special Aquatic Sites**:

3.3.5.1 *Sanctuaries and Refuges* - There are no sanctuaries or refuges in the vicinity of the project area.

3.3.5.2 *Wetlands* - No significant impacts would occur in this regard as a result of the discharge of dredged material at the CDF Site, UDS 5-19.

3.3.5.3 *Mud Flats* - No significant impacts would occur in this regard as a result of the

discharge of dredged material at the CDF Site, UDS 5-19.

3.3.5.4 *Vegetated Shallows* - Not applicable.

3.3.5.5 *Coral Reefs* - Not applicable.

3.3.5.6 *Riffle and Pool Complexes* - Not applicable.

3.5.6 **Threatened and Endangered Species** - Except for occasional transient individuals, there are no Federally listed endangered or threatened species known to exist within the project area. However, due to the project type and location, the maintenance dredging operation would have no impact on these species (USFWS Letter, dated July 10, 1995). Therefore, no impacts with regard to threatened or endangered species would be anticipated as a result of the proposed discharge.

3.5.7 **Other Wildlife** - CDF Site UDS 5-19 is situated in a highly urban environment that has been heavily disturbed in the past. The type of wildlife utilizing the Inner Harbor area and CDF Site would be predominately aquatic birds such as waterfowl and gulls. Terrestrial species such as the cottontail rabbit, Norway rat, mice, muskrat and songbirds may also utilize the site. Since the CDF is designed to contain polluted dredged material, contaminants may, to some degree, unavoidably bioaccumulate via the food chain in wildlife frequenting the site. However, these contaminated sediments have already been deposited at the CDF site in the past, providing no new significant adverse impacts to the limited wildlife species that are utilizing the disposal area.

3.5.8 **Actions Taken to Minimize Impacts** - The Contractor would be required to restrict the discharge of dredged material within the boundaries of the upland CDF disposal site so that any impacts on the land or water surrounding the Inner Harbor Area would be localized. The Contractor would be required to handle the dredged material in a manner which would minimize spillage of supernatant associated with the dredged material during transport (piping) to the CDF disposal site. The Contractor would be required to minimize accidental spills of fuel, oil and/or grease. The Contractor would be responsible for the installation and maintenance of silt curtains if needed across the mouth of the Harbor in order to minimize any de minimis discharges of sediments out of the Inner Harbor into the main body of Onondaga Lake.

3.6 Proposed Discharge Site Determinations.

3.6.1 **Mixing Zone Determination** - Not applicable

3.6.2 **Determination of Compliance with Applicable Water Quality Standards** - Onondaga Creek, located at the southeastern end of Onondaga Lake, drains a watershed area of about 115 square miles. The watershed encompasses much of the City of Syracuse and

extends south into the Tully Valley. Forty-five CSO's discharge into the Creek. Based upon recent monitoring data, it appears that the water quality of the Creek is degraded with elevated concentrations of fecal coliform bacteria, salts, and the heavy metals, lead, copper, and chromium. Additionally, sources of high sediment load carried by the Creek have been identified in southern Tully Valley. The Creek flows into Onondaga Lake at the Syracuse Inner Harbor area, the proposed project location. The NYSDEC water quality classification for Onondaga Creek from its mouth upstream to Temple Street in Syracuse is Class "D" (best usage for agricultural or as a source of industrial cooling or process water supply and any other usage except for fishing, bathing, or as a source of water supply for drinking, culinary, or food processing purposes); from Temple Street upstream to Tributary 5B the Creek is designated as being Class "B" (best usage for agricultural or as a source of industrial cooling or process water supply and any other usage except for fishing, bathing, or as a source of water supply for drinking, culinary, or food processing purposes); from this tributary upstream to the source of Onondaga Creek the Classification is "C" (best usage is form fishing and any other use except for bathing, as a source of water supply for drinking, culinary, or food processing purposes). The New York State Department of Environmental Conservation (NYSDEC) is reviewing this evaluation for compliance with Section 401 of the Clean Water Act and State water quality standards. Section 401 Water Quality Certification, or waiver thereof, will be granted pending NYSDEC's review of this Section 404 (b) (1) Evaluation.

3.6.3 **Potential Effects on Human Use Characteristics:**

3.6.3.1 *Municipal and Private Water Supply* - Not applicable

3.6.3.2 *Recreational and Commercial Fisheries* - Commercial fisheries not applicable. Recreational within the Inner Harbor may be temporarily disrupted during dredging operations, but should return to normal after project completion.

3.6.3.3 *Water-Related Recreation* - Dredging operations in the Harbor may temporarily affect water-related recreational activities (i.e., recreational boating) with the presence of dredging and construction equipment. Some aesthetically unpleasant transient effects associated with dredged material discharge operations (turbidity, odor, and noise, etc.) may occur in the Harbor itself, but should not have any effect on the main body of the lake where most of the recreational activities would take place..

3.6.3.4 *Aesthetics* - The temporary short-term turbidity and increase in suspended solid levels caused by the hydraulic dredging activities in the Harbor would be aesthetically displeasing. These effects would dissipate within days of the dredging operations.

3.6.3.5 *Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves* - No effects in this regard are anticipated as a result of the discharge of dredged material at the CDF UDS 5-19 Disposal Site.

3.7 Cumulative Effects on the Aquatic Ecosystem.

3.7.1 The primary, long-term cumulative physical effect of the discharge of dredged material at the CDF disposal site would not effect the aquatic environment. The hydraulic dredging operation within the harbor would effect the aquatic environment. The primary, long-term effect of the dredging the Inner Harbor would be the removal of contaminated sediments from the aquatice environment. The improved water quality in the Harbor could ultimately lead to a more diversified fishery at the site. The hydraulic dredging and disposal operation would result in the direct burial and/or physical impacts on benthos, thereby temporarily disturbing the biological community, primarily via the food web. Consequently, in contrast with pre-discharge conditions, the ecological community structure of the site may be slightly altered following dredged material discharge operations. However, recolonization by existing biota is expected to occur quickly. Therefore, no long-term, adverse impacts to the aquatic ecosystem are anticipated to result from any of these discharge actions.

3.8 Determination of Secondary Effects on the Aquatic Ecosystem.

3.8.1 No significant secondary impacts on the aquatic ecosystem are expected to result from the discharge of dredged material at the CDF UDS 5-19 Disposal Site.

## FINDING OF COMPLIANCE

## FOR

## SYRACUSE INNER HARBOR

## DREDGING AND CONFINED DISPOSAL OF DREDGED MATERIAL

1. No significant adaptations of the USEPA Guidelines were made relative to this Section 404(b)(1) Evaluation.

2. The considered alternatives for the discharge of sediments dredged from the Inner Harbor included: "No Action;" Alternative CDF Disposal Sites; and, Alternative Plans for Dredging Amounts. Of all the alternative plans considered and investigated, it was found that the selected dredging and CDF Disposal at UDS 5-19 would be the least costly, environmentally acceptable option.

3. The discharge of dredged material at the selected site should not contribute to a violation of State water quality standards outside the localized dredging area (Inner Harbor). Water quality in the Inner Harbor would return to ambient conditions within several days. Discharge operations would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of the selected discharge site would not jeopardize the continued existence of any species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or result in the likelihood or adverse modification of their critical habitat.

5. The proposed discharge would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Significant adverse effects on the life stages of aquatic life and other wildlife dependent on aquatic systems would not occur. The discharge operations would have no significant adverse effects on aquatic ecosystem diversity, productivity, and stability, or on recreational, aesthetic and economic values.

6. Appropriate steps to minimize potential adverse impacts of the discharge of dredged material at the selected discharge site in the aquatic ecosystem have been taken. These are described as follows:

·Applying state-of-the-art chemical testing protocol to the sediments proposed to be discharged to evaluate and ensure their suitability for discharge at the existing Confined Dispoasl Facility UDS 5-19. Sediments to be disposed are chemically and biologically compatible with

existing disposal site sediments.

7. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic steps would be taken. These include:

-utilizing an existing CDF disposal site for the discharge of Inner Harbor dredged material, thereby limiting any environmental impacts (i.e., on benthos, fisheries, water quality) to a single upland site that has been previously impacted;

-handling the dredged material in a manner which would minimize spillage during transport to the adjacent CDF disposal site; and,

-installation of a siltation curtain if needed at the mouth of the Inner Harbor entrance (Onondaga Creek) in order to prevent any large spillages of turbid water into the main body of Onondaga Lake.

8. On the basis of the Guidelines, the selected discharge site is specified as complying with the requirements of these Guidelines, with the inclusion of appropriate and practical conditions to minimize pollution and adverse effects on the aquatic ecosystem.

Table 1 - Onondaga Lake Inlet Bulk Chemical Analyses - Sediment Concentrations (mg/kg)

| Parameter | Sampling Sites | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Hg | 2.04 | 1.73 | 0.24 | 0.46 | 0.52 | 0.47 | 0.44 | 0.43 | 0.41 | 0.53 |
| Cd | 13 | 10.3 | 1.28 | 5.40 | 3.77 | 4.87 | 1.92 | 2.74 | 1.82 | 5.49 |
| Pb | 176 | 197 | 68.2 | 138 | 150 | 172 | 132 | 182 | 124 | 147 |
| Cu | 123 | 118 | 71.1 | 88.5 | 73.1 | 74.0 | 75.0 | 89.6 | 78.2 | 69.4 |
| DDT,DDE,DDD | <0.01 | <0.01 | 0.016 | 0.04 | <0.01 | 0.012 | 0.045 | 0.037 | 0.026 | 0.024 |
| Dieldrin | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| | | | | | | | | | | |
| PCB | 1.25 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 | <0.15 |
| 2,3,7,8 TCDD (1) | <1 | 1.4 | <1 | <1 | <1 | 1.1 | 1.7 | 1.2 | 1.2 | <1 |
| PAH | – | – | – | – | – | – | – | – | – | – |
| Anthracene | 17.0 | 4.6 | 20.0 | 9.4 | 1.5 | 8.0 | 21.0 | 7.0 | 0.86 | 26.0 |
| Benzo(a)anthracene | 16.0 | 14.0 | 12.0 | 9.4 | 9.0 | 6.4 | 29.0 | 6.4 | 5.4 | 30.0 |
| Chrysene | 12.0 | 11.0 | 9.4 | 6.8 | 10.2 | 6.7 | 26.0 | 6.8 | 6.2 | 30.0 |
| BTX (2) | 2.7 | 0.9 | 3.0 | 0.78 | 0.40 | 0.26 | 1.9 | 0.68 | 1.6 | 2.0 |
| Benzene | <0.9 | 0.39 | 0.41 | 0.41 | <0.9 | <0.9 | <0.95 | <0.95 | <0.8 | <1.0 |
| MEK (3) | 29 | 20 | 11 | 16 | 16 | 20 | 10 | 14 | 14 | 11 |
| Trichloroethylene | 1.8 | 1.7 | 1.4 | 0.46 | 1.8 | 1.8 | 1.9 | 1.9 | 1.6 | 2.0 |
| Ammonia | 580 | 101 | 194 | 226 | 266 | 198 | 387 | 316 | 398 | 191 |

(1) Concentrations in ppt
(2) Sum of Benzene & Toluene & Xylene
(3) Methyl Ethyl Ketone

Table 2 - Toxic Characteristic Leaching Procedure (TCLP) Comparison

| Constituent | Inner Harbor Levels (mg/l) | Regulatory Level (mg/l) |
|---|---|---|
| Arsenic | <0.060 - 0.110 | 5.0 |
| Barium | 0.275 - 1.270 | 100.0 |
| Benzene | <0.044 | 0.5 |
| Cadmium | 0.003 - 0.015 | 1.0 |
| Carbon Tet | <0.087 | 0.5 |
| Chlordane | <0.006 - <0.03 | 0.03 |
| Chlorobenzene | <0.044 | 10.0 |
| Cloroform | <0.087 | 6.0 |
| Chromium | 0.005 - 0.011 | 5.0 |
| o-Cresol | <0.002 - <0.01 | 200.0 |
| m-Cresol | <0.002 - <0.01 | 200.0 |
| p-Cresol | <0.002 - <0.01 | 200.0 |
| Cresol | <0.002 - <0.01 | 200.0 |
| 2,4-D | <0.004 - <0.02 | 10.0 |
| 1,4-Dichlorobenzene | <0.002 | 7.5 |
| 2,2-Dichloroethane | <0.087 | 0.5 |
| 1,1-Dichloroethylene | <0.087 | 0.7 |
| 2,4-Dichlorotoluene | <0.002 - <0.01 | 0.13 |
| Endrin | <0.004 - <0.02 | 0.02 |
| Heptachlor | <0.0015 - <0.0075 | 0.008 |
| Hexachlorobenzene | <0.002 - <0.01 | 0.13 |
| Hexachloro-1,3-butadiene | <0.002 - <0.01 | 0.5 |
| Hexachloroethane | <0.002 - <0.01 | 3.0 |
| Lead | 0.066 - 0.033 | 5.0 |
| Lindane | <0.004 - <0.02 | 0.4 |
| Mercury | <0.0002 | 0.2 |
| Methoxychlor | <0.01 - <0.05 | 10.0 |
| Methyl ethyl ketone | <0.87 | 200.0 |
| Nitrobenzene | <0.004 - <0.02 | 2.0 |
| Pentachlorophenol | <0.004 - <0.02 | 100.0 |
| Pyridine | <0.01 - <0.05 | 5.0 |
| Selenium | <0.050 | 1.0 |
| Silver | <0.007 | 5.0 |
| Tetrachloroethylene | <0.087 | 0.7 |
| Toxaphene | <0.1 - <0.5 | 0.5 |
| Trichloroethylene | <0.087 | 0.5 |
| 2,4,5-Trichlorophenol | <0.002 - <0.01 | 400.0 |
| 2,4,6-Trichlorophenol | <0.002 - <0.01 | 2.0 |
| 2,4,5-TP (Silvex) | <0.004 - <0.02 | 1.0 |
| Vinyl Chloride | <0.174 | 0.2 |

Table 3 - Particle Size Distribution of Samples from UDS 5-19

| Sample | %Sand | %Silt | %Clay |
|---|---|---|---|
| UDS5-19, TRENCH 1 | 51.13 | 44.63 | 4.24 |
| UDS5-19, TRENCH 2 | 58.49 | 36.38 | 5.14 |
| UDS5-19, TRENCH 3* | -- | -- | -- |
| UDS5-19, TRENCH 4 | 0.00 | 80.41 | 19.59 |
| UDS5-19, TRENCH 5 | 0.00 | 65.67 | 34.33 |

* Sample lost due to breakage of graduated cylinder

Table 4 - UDS 5-19 Metals and Inorganic Parameters (Mg/Kg)

| ANALYTE | METHOD | UDS5-19 TRENCH 1 (mg/Kg) | UDS5-19 TRENCH 2 (mg/Kg) | UDS5-19 TRENCH 3 (mg/Kg) | UDS5-19 TRENCH 4 (mg/Kg) | UDS5-19 TRENCH 5 (mg/Kg) |
|---|---|---|---|---|---|---|
| Arsenic | Furnace by 7060 | 1.10 | 0.99 (S) | 0.81 | 12 (S) | 11 (S) |
| Mercury | Cold Vapor by 7471 | 0.36 (U) | 0.32 (U) | 0.34 (U) | 0.91 | 0.77 |
| Aluminum | ICP by 6010 | 2000 | 2100 | 3100 | 11000 | 10000 |
| Antimony | ICP by 6010 | 29 (U) | 13 (U) | 27 (U) | 3 (U) | 3.1 (U) |
| Barium | ICP by 6010 | 110 | 43 | 130 | 190 | 180 |
| Beryllium | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 0.42 | 0.41 |
| Cadmium | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 8 | 8 |
| Calcium | ICP by 6010 | 210000 | 120000 | 190000 | 65000 | 61000 |
| Chromium | ICP by 6010 | 7.2 (U) | 4 | 6.8 (U) | 71 | 73 |
| Cobalt | ICP by 6010 | 7.2 (U) | 3.2 (U) | 6.8 (U) | 9.2 | 8.8 |
| Copper | ICP by 6010 | 18 (U) | 8 (U) | 17 (U) | 98 | 94 |
| Iron | ICP by 6010 | 4700 | 4900 | 5500 | 21000 | 20000 |
| Lead | ICP by 6010 | 21 (U) | 9.6 (U) | 20 (U) | 250 | 230 |
| Magnesium | ICP by 6010 | 6100 | 9400 | 6500 | 18000 | 17000 |
| Manganese | ICP by 6010 | 420 | 240 | 400 | 470 | 440 |
| Nickel | ICP by 6010 | 14 (U) | 6.4 (U) | 14 (U) | 46 | 43 |
| Potassium | ICP by 6010 | 1400 (U) | 640 (U) | 1400 (U) | 1100 | 1000 |
| Silver | ICP by 6010 | 3.6 (U) | 1.6 (U) | 3.4 (U) | 5.2 | 4.7 |
| Sodium | ICP by 6010 | 360 | 180 | 430 | 32 | 290 |
| Vanadium | ICP by 6010 | 3.6 (U) | 4 | 4.7 | 23 | 21 |
| Zinc | ICP by 6010 | 16 | 15 | 28 | 260 | 250 |
| Selenium | Furnace by 7740 | 3.6 (U) | 0.32 (U) | 3.4 (U) | 0.38 (U) | 0.38 (U) |
| Thallium | Furnace 7841 | 0.36 (U) | 0.32 (U) | 0.34 (U) | 0.5 | 0.38 (U) |
| Ammonia Nitrogen, (mg/Kg) | 350.3 | 400 | 320 (U) | 380 | 1100 | 430 |
| COD, (mg/Kg) | 8000M | 4600 | 2800 | 5500 | 6300 | 7400 |
| Cyanide, (mg/Kg) | 9012M | 0.72 (U) | 0.64 (U) | 0.68 (U) | 1.2 | 1.2 |
| Soilds, Total Volatile (TVS) (%) | 209F | 0.80 | 0.60 | 0.79 | 5.5 | 5.4 |
| Sulfate, (mg/Kg) | 375.4 | 1100 | 640 (U) | 680 (U) | 870 | 1400 |
| Sulfur, (%) | ASTM D129 | 0.11 | 0.094 (U) | 0.097 (U) | 0.12(U) | 0.12 (U) |
| TOC, (mg/Kg) | 9060 | 46000 | 18000 | 33000 | 47000 | 44000 |

Table 5 - UDS 5-19 Volatile Organics

(Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 2 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| Dichlorodifluoromethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Chloromethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Bromomethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Vinyl Chloride | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Chloroethane | 14 (U) | 13 (U) | 14 (U) | 76 (U) | 31 (U) |
| Trichlorofluoromethane | 7 (U) | 6 (U) | 14 (U) | 38 (U) | 15 (U) |
| Methylene Chloride | 10 (B) | 16 (B) | 7 (B) | 35 (JB) | 25 (B) |
| 1, 1-Dichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1-Dichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 2,2-Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| trans-1,2-Dichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| cis-1,2-Dichlorethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Chloroform | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1-Dichloropropene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Dibromomethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromochloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1, 1-Trichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Carbon Tetrachloride | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dibromoethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromodichloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 2-Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,3 -Dichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Trichloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Dibromochloromethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1, 1, 2-Trichloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Benzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Bromoform | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Tetrachloroethene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1,2,2-Tetrachloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,1,1,2-Tetrachloroethane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Toluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Chlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Ethylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Styrene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| meta+para-xylenes | 7 (U) | 6 (U) | 7 (U) | 12(J) | 15 (U) |
| ortho-xylene | 7 (U) | 6 (U) | 7 (U) | 44 | 5 (J) |
| Isopropylbenzene | 7 (U) | 6 (U) | 7 (U) | 29 (J) | 15 (U) |
| Bromobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,3-Trichloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| n-Propylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 2-Chlorotoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 4-Chlorotoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,3,5-Trimethylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| tert-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,4-Trimethylbenzene | 7 (U) | 6 (U) | 7 (U) | 190 | 26 |
| sec-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 10 (J) | 5 (J) |
| 1,3-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,4-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| p-Isopropyltoluene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| n-Butylbenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2-Dibromo-3-chloropropane | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,4-Trichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| Naphthalene | 7 (U) | 6 (U) | 7 (U) | 23 (J) | 15 (U) |
| Hexachlorobutadiene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |
| 1,2,3-Trichlorobenzene | 7 (U) | 6 (U) | 7 (U) | 38 (U) | 15 (U) |

U = Undetected
D = Dilution performed
J = Below method detection limit
B = Compound also detected in method blank
RE = Reanalysis performed (see non-conformance summaries)

Table 6 - UDS 5-19 Semi-Volatile Organics (Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 2 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| bis(2-Chloroethyl)ether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Phenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Chlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 3-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 4-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 2-Dichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 2'-oxybis(1-Chloropropane) | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachloroethane | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| N-Nitroso-di-n-propylamine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 3&4-Methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Nitrobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Isophorone | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Nitrophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4-Dimethylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| bis(2-Chloroethoxy)methane | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4-Dichlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 1, 2, 4-Trichlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Naphthalene | 480 (U) | 430 (U) | 450 (U) | 360 (JD) | 610 (JD) |
| 4-Chloroaniline | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachlorobutadiene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Chloro-3-methylphenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Methylnaphthalene | 480 (U) | 430 (U) | 450 (U) | 650 (JD) | 5300 (D) |
| Hexachlorocyclopentadiene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4, 6-Trichlorophenol | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 4, 5-Trichlorophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 2-Chloronaphthalene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Acenaphthylene | 480 (U) | 430 (U) | 450 (U) | 740 (JD) | 1000 (JD) |
| Dimethylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 2, 6-Dinitrotoluene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Acenaphthene | 480 (U) | 430 (U) | 450 (U) | 3600 (D) | 3900 (D) |
| 3-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 2, 4-Dinitrophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Dibenzofuran | 480 (U) | 430 (U) | 450 (U) | 650 (JD) | 770 (JD) |
| 2, 4-Dinitrotoluene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Nitrophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Fluorene | 480 (U) | 430 (U) | 450 (U) | 2500 (D) | 2700 (D) |
| 4-Chlorophenyl-phenylether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Diethylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Nitroaniline | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| 4, 6-Dinitro-2-methylphenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| n-Nitrosodiphenylamine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 4-Bromophenyl-phenylether | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Hexachlorobenzene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Pentachlorophenol | 1200 (U) | 1100 (U) | 1100 (U) | 2500 (U) | 6400 (U) |
| Phenanthrene | 480 (U) | 430 (U) | 49 (J) | 6400 (D) | 6000 (D) |
| Anthracene | 480 (U) | 430 (U) | 450 (U) | 2800 (D) | 3400 (D) |
| Carbazol | 480 (U) | 430 (U) | 450 (U) | 480 (JD) | 890 (JD) |
| Di-n-butylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Fluoroanthene | 96 (J) | 430 (U) | 61 (J) | 7000 (D) | 13000 (D) |
| Pyrene | 81 (J) | 430 (U) | 59 (J) | 7700 (D) | 12000 (D) |
| Butylbenzylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| 3, 3'-dichlorobenzidine | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(a)anthracene | 60 (J) | 430 (U) | 65 (J) | 3200 (D) | 6400 (D) |
| Chrysene | 48 (J) | 430 (U) | 68 (J) | 3800 (D) | 6600 (D) |
| bis(2-Ethylhexyl)phthalate | 480 (U) | 430 (U) | 450 (U) | 2600 (D) | 5200 (D) |
| Di-n-octylphthalate | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(b)fluoranthene | 480 (U) | 430 (U) | 450 (U) | 2500 (D) | 5500 (D) |
| Benzo(k)fluoranthene | 480 (U) | 430 (U) | 50 (J) | 2300 (D) | 3500 (D) |
| Benzo(a)pyrene | 480 (U) | 430 (U) | 54 (J) | 2500 (D) | 4600 (D) |
| Indeno(1, 2,3-cd)pyrene | 480 (U) | 430 (U) | 450 (U) | 1900 (D) | 3300 (D) |
| Dibenz(a, h)anthracene | 480 (U) | 430 (U) | 450 (U) | 1000 (U) | 2600 (U) |
| Benzo(g, h, i)perylene | 480 (U) | 430 (U) | 450 (U) | 1700 (D) | 3000 (D) |

U = Undetected
D = Dilution performed
J = Below method detection limit
B = Compund also detected in method blank
RE = Reanalysis performed (see non-conformance summaries)

Table 7 - UDS 5-19 Pesticides and PCB's (Mg/Kg)

| COMPOUND | UDS5-19 TRENCH 1 (ug/Kg) | UDS5-19 TRENCH 12 (ug/Kg) | UDS5-19 TRENCH 3 (ug/Kg) | UDS5-19 TRENCH 4 (ug/Kg) | UDS5-19 TRENCH 5 (ug/Kg) |
|---|---|---|---|---|---|
| **Pesticides** | | | | | |
| Lindane | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| Heptachlor | 1.4 (U) | 1.3 (U) | 1.4 (U) | 1.5 (U) | 1.5 (U) |
| Aldrin | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| Heptachlor epoxide | 4.8 (U) | 4.3 (U) | 4.5 (U) | 5.1 (U) | 5.1 (U) |
| Endosulfan I | 2.4 (U) | 2.1 (U) | 2.3 (U) | 34 | 2.6 (U) |
| Dieldrin | 1 (U) | 0.9 (U) | 0.9 (U) | 1 (U) | 1 (U) |
| Endosulfan II | 1.9 (U) | 1.7 (U) | 1.8 (U) | 2 (U) | 2.1 (U) |
| 4,4'-DDT | 0.5 (U) | 0.4 (U) | 0.5 (U) | 0.5 (U) | 0.5 (U) |
| Endrin aldehyde | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| Methoxychlor | 200 | 17 (U) | 180 | 20 (U) | 21 (U) |
| alpha-BHC | 1.2 (U) | 1.1 (U) | 1.1 (U) | 1.3 (U) | 1.3 (U) |
| beta-BHC | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| delta-BHC | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| 4,4'-DDE | 2.4 (U) | 2.1 (U) | 2.3 (U) | 23 | 2.6 (U) |
| Endrin | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| 4,4'-DDD | 2.4 (U) | 2.1 (U) | 2.3 (U) | 72 | 2.6 (U) |
| Endosulfan sulfate | 4.8 (U) | 4.3 (U) | 4.5 (U) | 5.1 (U) | 5.1 (U) |
| Endrin ketone | 81 | 2.1 (U) | 77 | 2.5 (U) | 2.6 (U) |
| Chlordane | 2.4 (U) | 2.1 (U) | 2.3 (U) | 2.5 (U) | 2.6 (U) |
| Toxaphene | 12 (U) | 11 (U) | 11 | 13 (U) | 13 (U) |
| **Polychlorinated Biphenyls** | | | | | |
| Aroclor 1016 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1221 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1232 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1242 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1248 | 4900 | 21 (U) | 1400 | 530 | 515 |
| Aroclor 1254 | 24 (U) | 21 (U) | 23 (U) | 25 (U) | 26 (U) |
| Aroclor 1260 | 24 (U) | 21 (U) | 23 (U) | 520 | 26 (U) |

U = Undetected
D = Dilution performed
J = Below method detection limit
RE = Reanalysis performed (see non-conformance summaries)

Table 8 - UDS 5-19 Furans and Dioxins (pg/g)

| Analyte | UDS5-19 Trench 1&2 pg/g |
|---|---|
| **Furans** | |
| TCDFs (total) | ND |
| 2, 3, 7, 8-TCDF | ND |
| PeCDFs (total) | ND |
| 1, 2, 3, 7, 8-PeCDF | ND |
| 2, 3, 4, 7, 8-PeCDF | ND |
| HxCDFs (total) | ND |
| 1, 2, 3, 4, 7, 8-HxCDF | ND |
| 1, 2, 3, 6, 7, 8-HxCDF | ND |
| 2, 3, 4, 6, 7, 8-HxCDF | ND |
| 1, 2, 3, 7, 8, 9-HxCDF | ND |
| HpCDFs (total) | ND |
| 1, 2, 3, 4, 6, 7, 8-HpCDF | ND |
| 1, 2, 3, 4, 7, 8, 9-HpCDF | ND |
| OCDF | ND |
| **Dioxins** | |
| TCDDs (total) | ND |
| 2, 3, 7, 8-TCDD | ND |
| PeCDDs (total) | ND |
| 1, 2, 3, 7, 8-PeCDD | ND |
| HxCDDs (total) | ND |
| 1, 2, 3, 4, 7, 8-HxCDD | ND |
| 1, 2, 3, 6, 7, 8-HxCDD | ND |
| 1, 2, 3, 7, 8, 9-HxCDD | ND |
| HpCDDs (total) | ND |
| 1, 2, 3, 4, 6, 7, 8-HpCDD | ND |
| OCDD | 20 |

ND = Not Detected

Figure -1 - Onondaga Lake, Syracuse
Inner Harbor
Vicinity Map

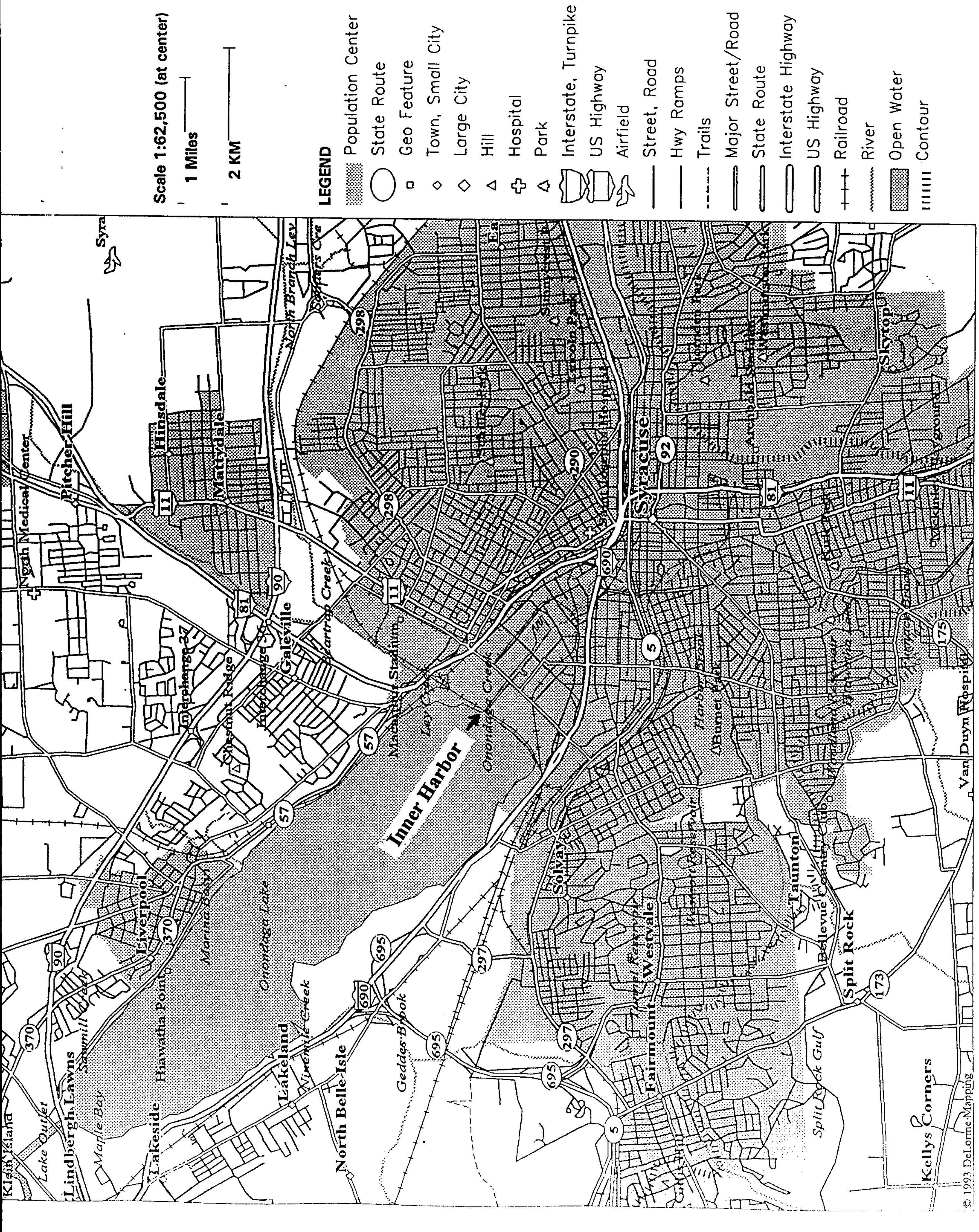


Figure -2 - Onondaga Lake, Syracuse
Inner Harbor
General Project Location Map

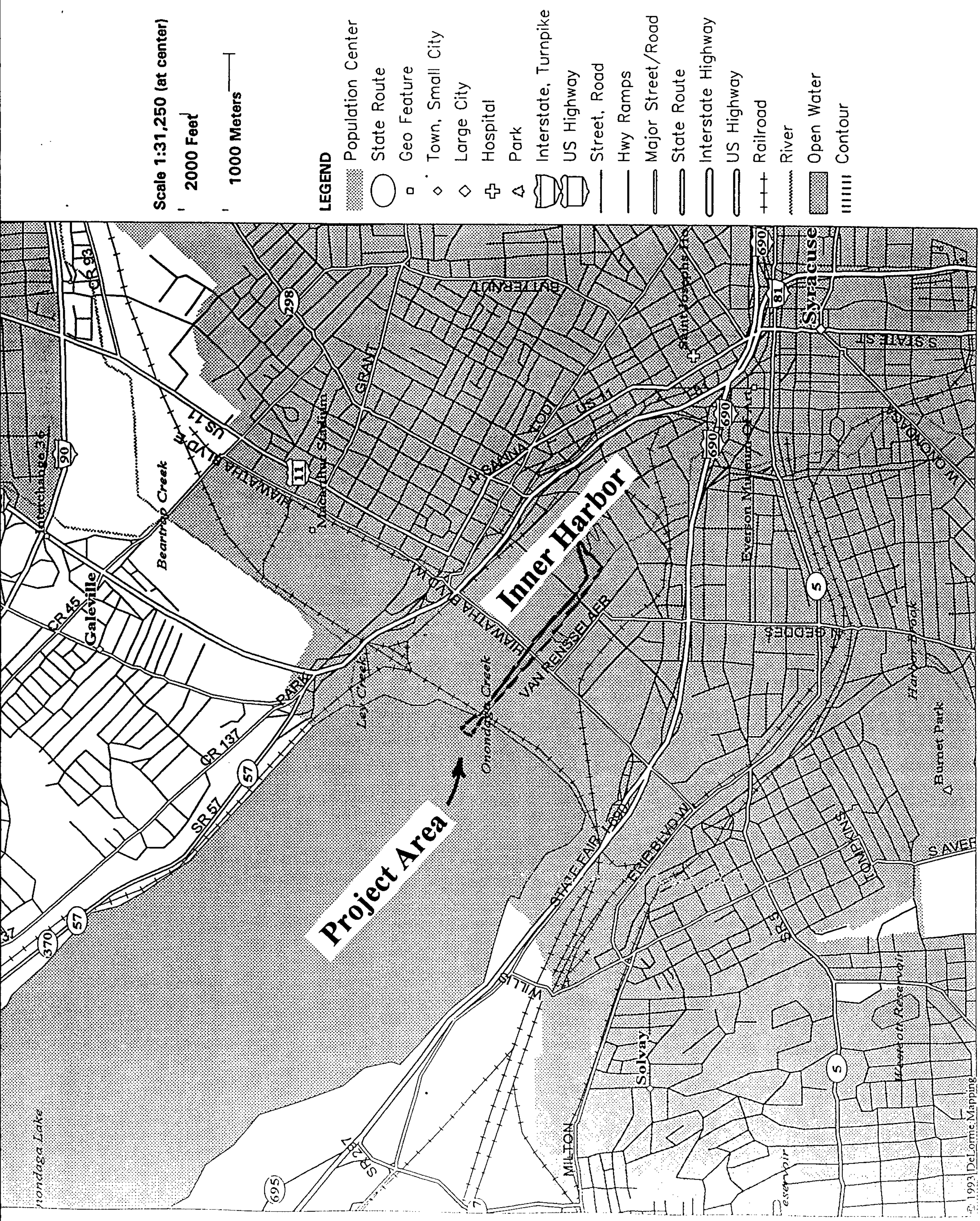
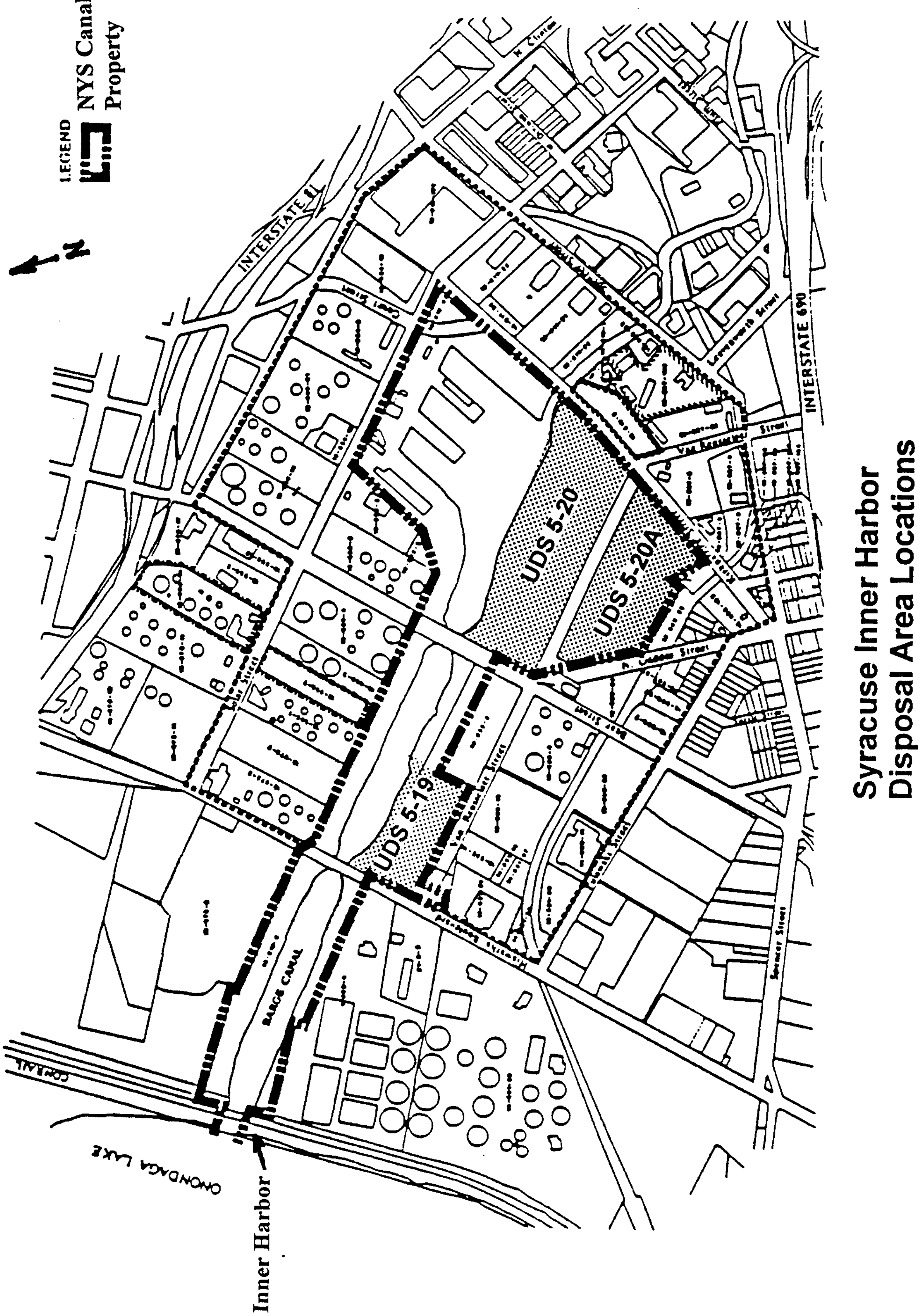


Figure -3 - Onondaga Lake, Syracuse
Inner Harbor
Detailed Project Location Map



# ONONDAGA LAKE
# NON-POINT SOURCES
# (DIVERSION / SEDIMENTATION PLAN)

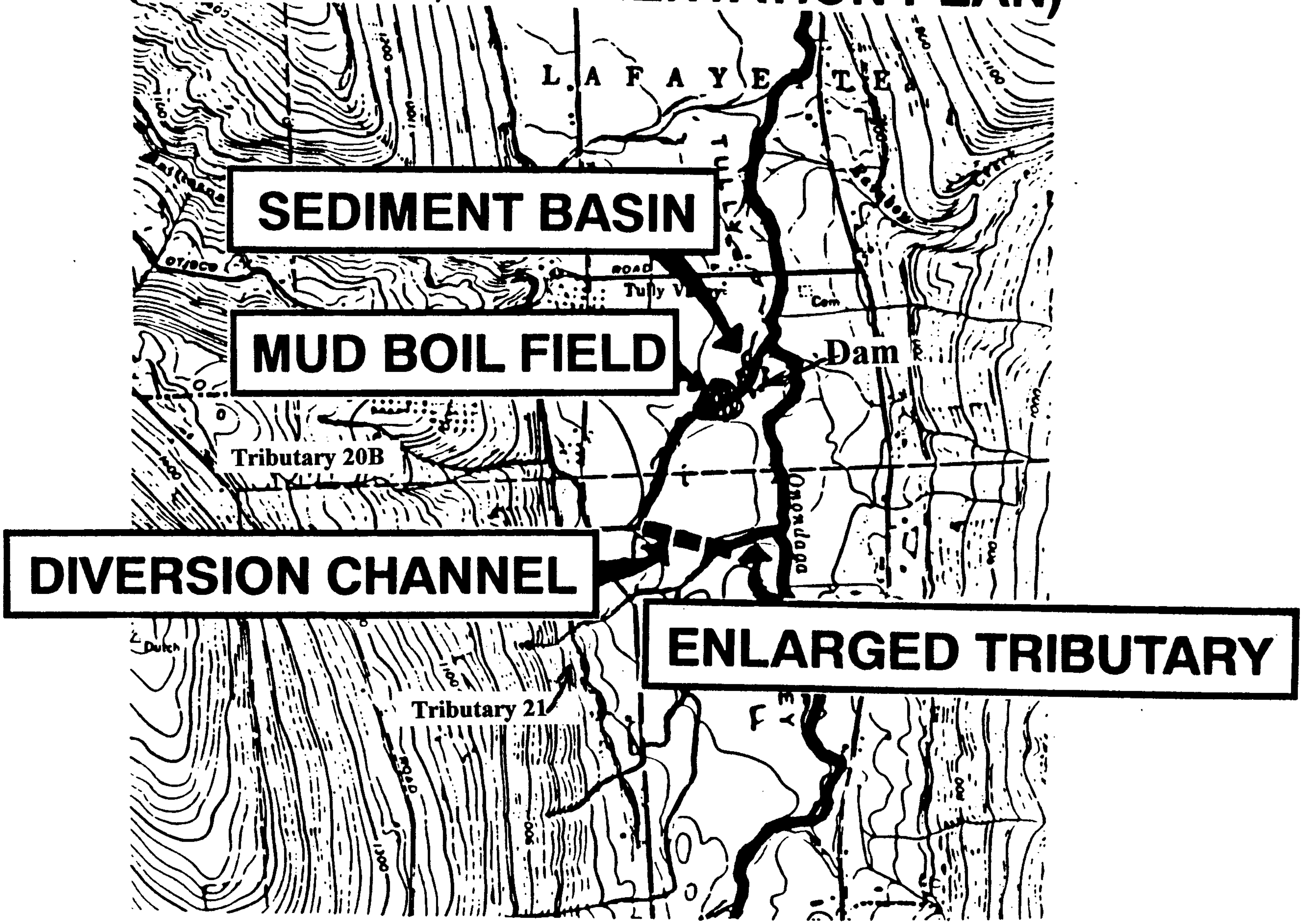


Figure 5 - Onondaga Lake, Syracuse, Inner Harbor
Location Map of Existing
Upland Disposal Facility (UDS 5-19)

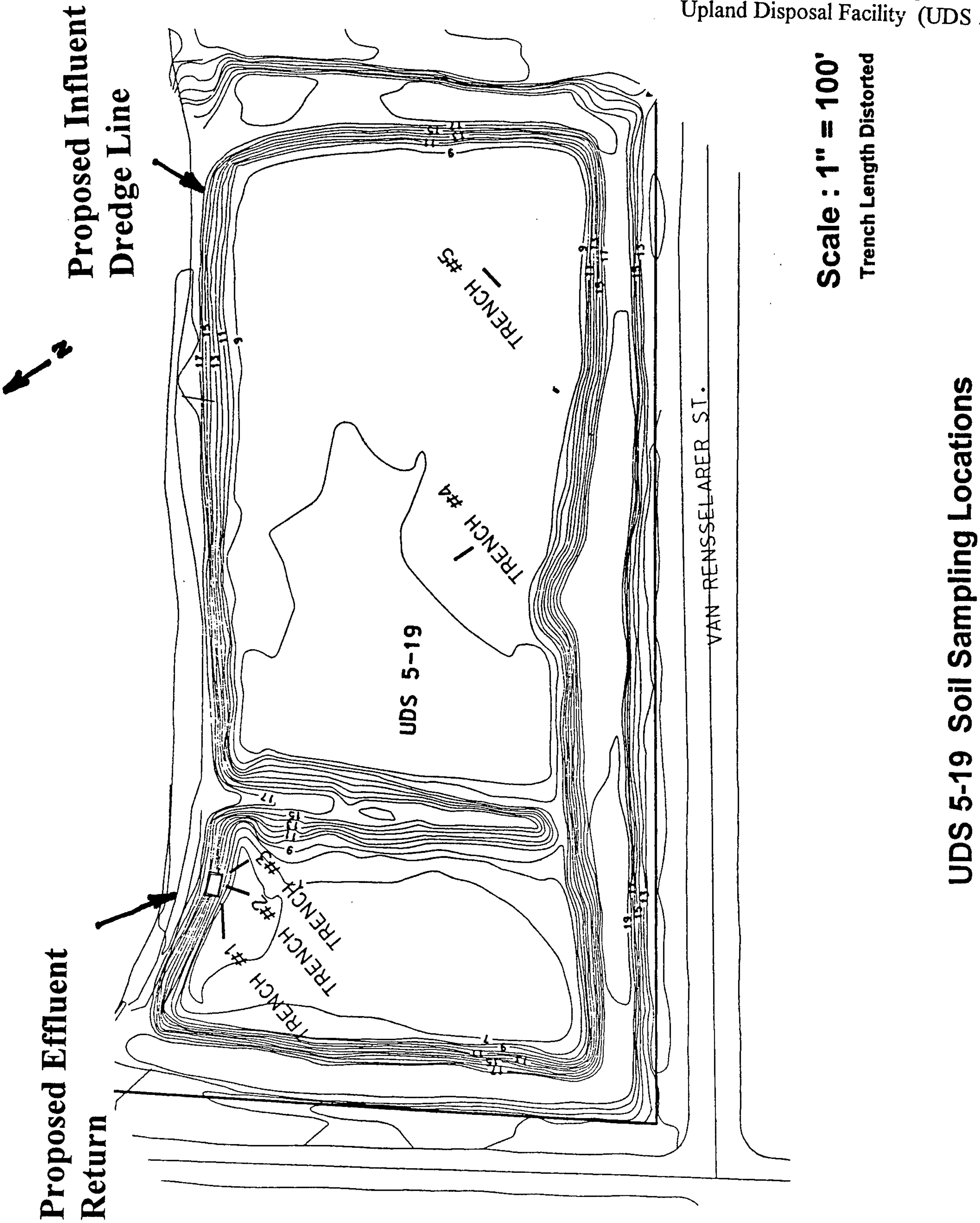
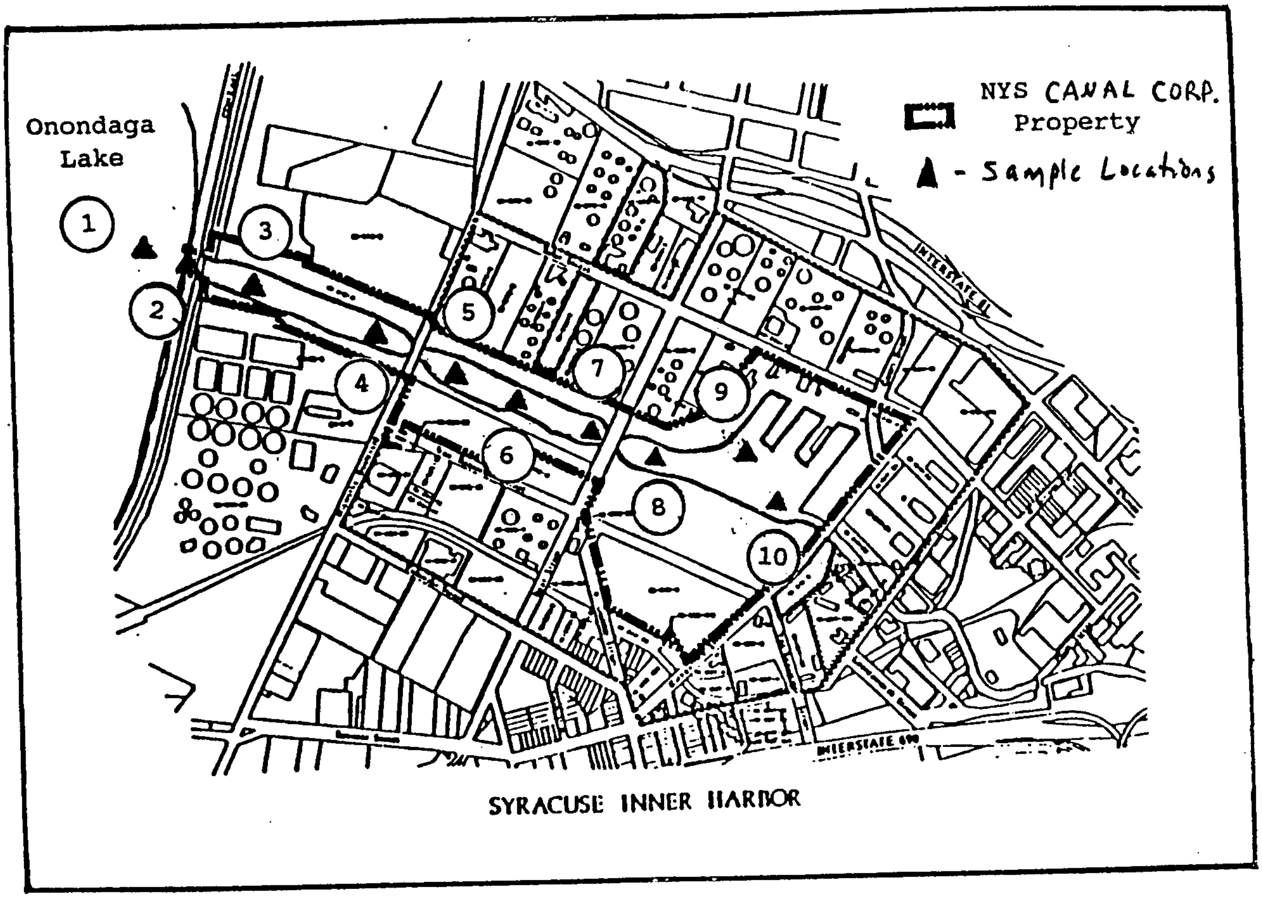


Figure 6 - Sediment Sampling Locations in Onondaga Lake - Syracuse Inner Harbor Area



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SYRACUSE INNER HARBOR
ONONDAGA LAKE

DREDGING AND CONFINED
DISPOSAL OF DREDGED MATERIAL
ONONDAGACOUNTY, NEW YORK

CORRESPONDENCE APPENDIX EA-C

U.S. ARMY CORPS OF ENGINEERS
1776 NIAGARA STREET

JOHN A. DeFRANCISCO
SENATOR, 49TH DISTRICT
CHAIRMAN
TOURISM, RECREATION
& SPORTS DEVELOPMENT
COMMITTEES
BANKS
CODES
ENERGY
HEALTH
INVESTIGATIONS, TAXATION
& GOVERNMENTAL OPERATIONS
JUDICIARY
LOCAL GOVERNMENT

THE SENATE
STATE OF NEW YORK

95 JUL 10 PM 1:01

10 JUL 95 12 00

ALBANY OFFICE
ROOM 903
LEGISLATIVE OFFICE BUILDING
ALBANY, NEW YORK 12247
(518) 455-3511

DISTRICT OFFICE
STATE OFFICE BUILDING - ROOM 804
333 EAST WASHINGTON STREET
SYRACUSE, NEW YORK 13202
(315) 428-7632

July 7, 1995

Mr. William Janowsky
Environmental Analysis Section
Department of the Army Buffalo District, Corps of Engineers
1778 Niagara Street
Buffalo, New York 14207-3199

Dear Mr. Janowsky:

It has come to my attention that the Army Corps of Engineers plans to dredge the inner harbor area of Onondaga Lake and dispose the 207,000 cubic yards of dredge material along the west banks of the harbor.

The disposal sites you have identified are currently under consideration for a $40 million aquarium project. I have worked closely with the State Thruway Authority, the City of Syracuse, and the Lakefront Development Corporation on this project. As Chairman of the Senate Tourism Committee, I feel the privately funded Aquarium has tremendous potential as a regional tourist attraction and will act as a catalyst for further economic development in the inner harbor area.

Your plan to dispose of dredging spoils on the site of the proposed facility, however, will have a chilling effect on its development.

I have already contacted the New York State Thruway Authority to express my opposition to using this site as a spoil depository and I ask that you work with officials from the City of Syracuse and the Thruway Authority to come up with an alternative plan for the disposal of the dredged material.

Thank you for your consideration in this important matter.

Very truly yours,

John A. DeFrancisco
State Senator

JAD/tf
cc: Steve Morgan
Susan Kupferman
James Breuer
Irwin Davis

*Office of the Mayor*

PHONE 468-1679

VILLAGE OF SOLVAY
1100 WOODS ROAD
SOLVAY, NEW YORK 13209

MARIO C. DE SANTIS
MAYOR

June 30, 1995

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

Attention: Mr. William Janowsky

Dear Mr. Janowsky:

RE: Onondaga Lake, Onondaga County, NY
Dredging and Associated Placement of
Dredged Material in a Confined Disposal
Facility (CDF) - Environmental Scoping

Based on the information supplied in dredging the inner harbor of Onondaga Lake, the Village of Solvay does not find any significant issues to comment on.

Sincerely,

Mario C. De Santis
Mayor
Village of Solvay

MCD/pjd

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

**New York State Office of Parks, Recreation and Historic Preservation**
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189

518-237-8643

~~Orin Lehman, Commissioner~~

Bernadette Castro
Commissioner

July 27, 1995

Richard Leonard, Chief
Environmental Analysis Section
Department of The Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Mr. Leonard:

Re: CORPS
Dredging/Onondaga Lake/Canal Terminal
Syracuse, Onondaga County
95PR1586

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the dredging project for the Inner Harbor on Onondaga Lake, Syracuse, being planned by the New York State Thruway Authority Office of Canals in accordance with Section 106 of the National Historic Preservation Act of 1966 and the relevant implementing regulations.

Based upon this review, we would like to make you aware that the canal terminal and associated buildings at the Inner Harbor have been previously determined to be eligible for listing on the State and National Registers of Historic Places. Nevertheless, this project will have No Effect as it is limited to dredging within the canal.

As long as the spoil sites selected are locations that have been previously used or disturbed, the SHPO has no concerns regarding this aspect of the project. If new sites are selected we would appreciate being consulted to ensure that such sites are not archeologically sensitive areas.

When responding, please be sure to refer to the SHPO project review (PR) number noted above. If you have any questions, please feel free to call me at (518) 237-8643 ext. 255.

Sincerely,

Robert D. Kuhn

Robert D. Kuhn, Ph.D.
Historic Preservation Coordinator
Field Services Bureau

RDK:cm

# The Aquarium Development Company, Inc.

June 28, 1995

3 JUL 95 11 36
MAILROOM
CENCB-IM-S

Mr. Richard Leonard
Chief, Environmental Analysis Section
Department of the Army Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, NY 14207-3199

Re: Onondaga Lake, Onondaga County, NY Dredging and Associated Placement of Dredge Materials in a Confined Disposal Facility

Dear Mr. Leonard:

I am in receipt of your information dated June 7, 1995 regarding the Army Corps of Engineers plan to dredge the inner harbor on Onondaga Lake and dispose of 207,000 cubic yards of dredge materials. Per your request, I am writing to provide you with the following comments and concerns as it relates to this proposal.

It is important to note that the areas you have identified for disposal of dredge materials are the same areas New York State has slated and is promoting for commercial, residential, and tourist development properties. The New York State Thruway Authority (NYSTA) has presently engaged the Lakefront Development Authority to develop Phase I of the Inner Harbor. In addition, NYSTA has entered into an agreement with the Aquarium Development Company to pursue development of a $40 million aquarium on sites UDS 20 and UDS 20 annex. These sites are located on the attached map of the harbor and highlighted in yellow. The overall plans for the Inner Harbor project would include the development of all the properties immediately adjacent to the water for either commercial, residential or other public uses.

The disposal of dredged spoils on any of these sites would have a tremendous adverse impact on the development of the Inner Harbor as a whole and especially would bring a halt to any thoughts regarding the development of an aquarium on the UDS 20 and UDS 20 annex sites.

As you know, the disturbance, the odor, and the change in grade coupled with the unsatisfactory subsurface materials would render these properties useless for a number of years. The same unpleasant conditions would make the Phase I properties to the east extremely less attractive for development.

It is our recommendation that the Corps review these plans and look at the possibility of using these spoil materials to further enhance the development of the Inner Harbor properties. One idea would be to create a land mass at the outlet of Onondaga Creek. These spoils could be used to perhaps cover up other environmental concerns at the lake edge and/or create a new

4 Clinton Square, Syracuse NY 13202
Tel: 315.422.0288
Fax: 315.422.0776

# The Aquarium Development Company, Inc.



wetland and/or become a barrier that would allow the further development of a harbor for large boats that cannot come into the Inner Harbor itself.

I trust you will find these comments constructive and take them into consideration. I would appreciate knowing the Corps' plans as soon as possible as this will have a direct impact on the aquarium development.

Very truly yours,
AQUARIUM DEVELOPMENT COMPANY

James V. Breuer
President

JVB/jen

enc.

cc. w/enclosure: Congressman James Walsh
Senator John DeFrancisco
Assemblyman Michael Bragman
County Executive Nicholas J. Pirro
Mayor Roy Bernardi
Irwin Davis, MDA
Tom Blanchard, MDA
John Ewashko, NYSTA
David Bottar
Partners of Aquarium Development Company

\aquarium\leonard.let

4 Clinton Square, Syracuse NY 13202
Tel: 315.422.0288
Fax: 315.422.0776

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, New York 13045

95 JUL 19 PM 2:06

July 10, 1995

Colonel Walter Neitzke
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Attention: William Janowsky

Dear Colonel Neitzke:

This responds to your letter of June 7, 1995, requesting our review and comment on the proposed dredging of the Syracuse Inner Harbor (a.k.a. the Barge Canal Terminal), and associated placement of dredged material in a confined disposal facility (CDF), at Onondaga Lake, City of Syracuse, Onondaga County, New York.

This letter provides technical assistance only and does not constitute the report of the Secretary of the Interior on the project within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 U.S.C. 661 et seq.).

The proposed project will involve the removal by hydraulic dredging of approximately 158,355 cubic meters of dredged material from the harbor area. Future dredging of the harbor may evolve into a biennial cycle which could result in the removal of additional quantities of dredged materials.

Three potential disposal sites are under consideration, all within the harbor area. The sites chosen have all been highly disturbed in the past. The sites are designated as Upland Disposal Site (UDS) 19 - 3.7 hectares, UDS 20 - 5.7 hectares, and UDS 20 Annex - 4.1 hectares.

UDS 20 is the largest of the sites and is immediately adjacent to, and bounded by, the harbor to the east, Kirkpatrick Street to the south, Van Rensselaer Street on the west, and Bear Street to the north. This site was previously used as a disposal area in 1980. UDS 20 Annex is across Kirkpatrick Street from UDS - 20 and has not been used as a disposal site in the past. UDS 19 is also immediately adjacent to the harbor to the east, but is on the north side of Bear Street, with Van Rensselaer Street along the west side and Hiawatha Boulevard along the north side. This site was also previously used in 1980.

<u>Existing Conditions</u>

UDS 19 is heavily dominated by phragmites (giant reed grass) (*Phragmites communis*). Co-dominant trees at the site are eastern cottonwood (*Populus deltoides*) and box elder

(*Acer negundo*). There is much overhanging vegetation along the harbor side. This site is subject to development impacts as there is much urban and commercial development on nearly all sides.

UDS 20 supports a virtually monotypic stand of phragmites throughout the site, although there are a few scattered trees represented by eastern cottonwood, box elder, and tree-of-heaven (*Ailanthus altissima*). The existing dike is well established with grass and native plants. Other woody or herbaceous vegetation includes goldenrod (*Solidago spp.*), burdock (*Arctium minus*), wild grape (*Vitis spp.*), violet (*Viola spp.*), buckthorn (*Rhamnus spp.*), daisy fleabane (*Erigeron annuus*), and choke cherry (*Prunus virginiana*).

UDS 20 Annex is used as a polo field. The shrubs, trees, and forbs listed above can be found around the fringe of most of the field, although phragmites is scarce. The field itself is covered predominantly by bluegrass (*Poa spp.*).

The harbor is part of the New York State Barge Canal system and is administered by the New York State Thruway Authority through their Office of Canals. The harbor is actually the highly modified mouth of Onondaga Creek, the inlet and main tributary to Onondaga Lake. The harbor is surrounded by, in addition to the existing upland disposal sites, petroleum tank farms, terminal and dock facilities, small business facilities, and vacant landscaped areas.

Aquatic resources within the harbor are generally limited and there is no current information on fishery resources within the harbor area. The New York State Department of Environmental Conservation (NYSDEC), Region 7, Cortland, New York, and the Upstate Freshwater Institute have surveyed the fish communities of Onondaga Lake in the recent past. The data has been presented by the Institute in a report on "The State of Onondaga Lake" prepared for the Onondaga Lake Management Council, and it is likely that at least some species found in the lake may enter the harbor.

There is considerable turbidity as a result of a heavy sediment load carried into the harbor from the Onondaga Creek watershed which, in turn, contributes to the filling in of the harbor and the need for dredging.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the respective project impact areas. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the U.S. Fish and Wildlife Service (Service). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation.

Impact Analysis

The proposed disposal sites, with the exception of UDS 20 Annex, have been used for the disposal of dredged materials in the past and, while capable of supporting some urban

wildlife, are of relatively low value. Originally there were an additional 7 disposal sites under consideration, ranging as far away as Baldwinsville. A joint field reconnaissance of these sites on November 29-30, 1994, indicated that they were all of high value to aquatic and/or terrestrial species and it was the consensus of the U.S. Army Corps of Engineers (Corps) and the Service that they not be considered further as potential disposal sites for harbor dredged materials. It was determined for both environmental and logistical reasons that the currently proposed sites were the only ones that the Service would find acceptable.

However, a significant problem associated with dredging the Harbor is the contaminated nature of the sediments. The site has been extensively used for on- and off-loading of petroleum and industrial products and is subjected to surface and sub-surface runoff from the nearby petroleum tank farms. The Corps has tested the harbor sediments and Service contaminants personnel have reviewed the data provided by the Corps.

While the levels of polyaromatic hydrocarbons (PAH) (particularly acenaphthene and phenanthrene), DDT, and polychlorinated biphenyls (PCB) are of concern, the inorganic levels should drive any decision making. Lead is sufficiently elevated at all sites, except Sample Site (SS) 3, to warrant special handling. Zinc is elevated at many of the sample sites and chromium, copper, and mercury are elevated at SS1 and SS2. Unless the sediments at SS3 can be distinguished from adjacent, more contaminated sediments during dredging, it would be advisable to dredge the entire harbor using precautions associated with toxic sediments.

The NYSDEC has guidelines for dredging and disposing of these types of sediment (NYSDEC Interim Guidance for Freshwater Navigational Dredging). If these guidelines are imposed, all of the dredged sediments, except from SS3, must be disposed in a Part 373 Site based on the lead concentrations alone.

The proposed hydraulic dredging is the preferred method since it causes less sediment dispersal. Silt curtains should also be employed to further minimize dispersal, and there should be suitable control of return water from the disposal area. The NYSDEC may require a specialized cap, but a moderate layer (0.3-0.45 meter) of clean fill placed on top of the dredged sediments may be sufficient.

<u>Summary</u>

The use of the existing upland disposal sites adjacent to the project is preferable to double handling of the dredged materials and transportation to more valuable sites some distance away. The contaminated nature of the sediments needs to be addressed and requirements for special handling and precautions are likely to be imposed.

Thank you for the opportunity to comment on this proposal. Please keep us informed of any changes in project plans. If you have any questions regarding this letter, contact Tom McCartney at (607) 753-9334.

Sincerely,

James A. Stilwell

for Sherry W. Morgan
Field Supervisor

cc: NYSDEC, Cortland, NY (Regulatory Services)
NYSDEC, Latham, NY
EPA, Chief, Marine & Wetlands Protection Branch, New York, NY

OFFICE OF THE MAYOR

Roy A. Bernardi, Mayor

June 29, 1995

Mr. William Janowsky
Environmental Analysis Section
Department of the Army
Buffalo District, Corps of Engineers
1778 Niagara Street
Buffalo, New York 14207-3199

RE: Onondaga Lake, Onondaga County, New York
Dredging and Associated Placement of Dredged Material in a Confined Disposal Facility (CDF)
Environmental Scoping

Dear Mr. Janowsky:

I am writing in response to a letter issued by Richard Leonard dated June 7, 1995, in which he solicits comments from interested parties with regard to the Army Corps of Engineers plans for Canal Harbor dredging and placement of dredge spoils.

First, let me express my support for the Army Corps intent to dredge the Syracuse Canal Harbor. This activity is extremely important as the City, the Lakefront Development Corporation, and the New York State Thruway Authority work toward a major improvement program for the Canal Harbor Area. The proposed program is scheduled to include a new marina, charter boat facilities and accommodations for cruise ships, excursion boats, and a variety of other educational and recreational vessels which will directly benefit from the intended dredging.

In conjunction with the Thruway Authority's plans for Canal Harbor Development, they have recently approved an option to a company called the Aquarium Development Corporation, which allows them a one-year period in which to negotiate a lease for the west bank of the Canal Harbor. Their plan is to construct a $40 million aquarium facility. This site is the same site identified as "UDS 5-20" on the Army Corps map of alternative CDF sites. The Aquarium Development Corporation had also requested use of the

203 CITY HALL / SYRACUSE, N.Y. 13202-1473 / (315) 448-8005 / FAX# 448-8067

Thruway Authority site "UDS 5-20 Annex" with the intent that this site might provide additional parking required to support the intended aquarium facility.

The Canal Harbor Development Project has been offered by the Thruway Authority as an important element in the Authority's plans to revitalize the New York State Canal System. The proposed Aquarium is envisioned as the centerpiece, and in fact, the driving force for that development project. With an anticipated attendance level of in excess of 1.2 million visitors per year, this facility is expected to create a captive audience for businesses throughout the Harbor and the surrounding City, and to serve as a major catalyst for business development and revitalization in the area. As such, I am writing to request that you reconsider including these sites as alternative dredge spoil locations.

With regard to site UDS 5-19, again, plans to deposit dredge spoils at this location could severely impede development on this prime development site. The Canal Harbor Area has historically been viewed as an industrial oil storage and waste depository. The City of Syracuse has worked very diligently in public/private partnerships over the past several years to clean up this area and to create a new ambiance, one of an active, vibrant harborfront. To continue to use sites within this area as dumping grounds is in direct opposition to the City's efforts to recover this important asset.

Accordingly, no site within the Canal Harbor Area is acceptable to the City as a disposal site. It is our position that the spoils should be disposed of outside the Canal Harbor Area. An alternative that would be strongly supported by the City for example, would be the possibility of disposing the dredge spoils in Onondaga Lake, at the mouth of the Canal in such a way as to create an extension of the existing land mass that might then be used to support a marina for large vessels that could not be accommodated by the canal.

A second alternative might be to explore the nearby shores of Onondaga Lake and to dispose of the spoils in an area that is not as accessible, visible, nor as valuable as the sites proposed in the Canal Harbor (consideration might for example, be given to the Solvay Waste Bed site).

In view of the high visibility of the Canal Harbor redevelopment project currently in progress, and given the deterrent that disposal of dredge spoils would pose to pending and anticipated development within the area, I would ask that you reconsider use of the

Canal Harbor sites. I and my staff would be happy to work with you to locate other, more suitable locations within close proximity to the Harbor area.

Sincerely,

Roy A. Bernardi

Roy A. Bernardi
Mayor

cc. Peter Tufo, NYSTA
Irwin Davis, LDC
Al Dal Pos, ADC

Central New York Regional Planning & Development Board
90 Presidential Plaza, Suite 122, Syracuse, New York 13202 • Tel. (315) 422-8276 • Fax 422-9051
Mary A. Messinger, Chairperson Gary G. Hayes, Executive Director

6 July 1995

MAILROOM
CENCB-IM-S

Mr. Richard Leonard
Chief, Environmental Analysis Section
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207-3199

RE: Onondaga Lake, Onondaga County, New York
Dredging and Associated Placement of Dredge
Materials in a Confined Disposal Facility

Dear Mr. Leonard:

I am in receipt of your environmental notice dated June 7, 1995 regarding the Army Corps of Engineer's plan to allow the NYS Thruway Authority (NYSTA) to dredge the Inner Harbor on Onondaga Lake and dispose of 227,000 cubic yards of dredge materials. I am writing to provide you with the following comments and concerns as it relates to this plan.

It is important to note that the properties identified for disposal of dredge materials are immediately adjacent to the Inner Harbor. This area has been the subject of an extensive community planning effort over the past four years and has been slated for commercial, residential, and tourist development. Recently the NYSTA engaged the Lakefront Development Corporation to develop Phase I of the Inner Harbor. The NYSTA has also entered into an agreement with the Aquarium Development Company to pursue development of a $40 million aquarium in the Inner Harbor on sites designated by the Corps as UDS 20 and UDS 20 Annex.

The disposal of dredged spoils on any sites in the Inner Harbor area would have a tremendous adverse impact on current development plans. These adverse impacts were discussed at length during a meeting on November 29, 1994 among representatives from the Corps, NYSTA, City of Syracuse, U.S. Fish and Wildlife Service, NYS Department of Environmental Conservation and the Central New York Regional Planning and Development Board. It was our understanding that based upon these discussions, the Corps would investigate alternative disposal plans.

Based upon the progress which has been made to date on development plans for the Inner Harbor, I strongly recommend that the Corps oppose any plans to dispose of dredge spoils anywhere in the Inner Harbor area. In addition, I recommend that the Corps begin immediately an investigation of alternative disposal plans in cooperation with community representatives from Syracuse and the NYSTA.

Your consideration of these comments would be greatly appreciated. If the Central New York Regional Planning and Development can be of assistance with the investigation of alternative disposal plans, please feel to give me a call.

Sincerely,

GARY G. HAYES, AICP
Executive Director

cc: Congressman James Walsh
Senator John DeFrancisco
Assemblyman Michael Bragman
County Executive Nicholas J. Pirro
Mayor Roy Bernardi
Irwin Davis, MDA
John Ewashko, NYSTA
Susan Kupferman, NYSTA
Partners of Aquarium Development Company

GGH/tas